NATIONAL BISON RANGE NWR
NARRATIVE REPORT - 1967

NATIONAL BISON RANGE

Refuge Narrative Report

Calendar Year 1967

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UNITED STATES DEPARTMENT OF THE INTERIOR

Bureau of Sport Fisheries and Wildlife

Fish and Wildlife Service

Moiese, Montana

NATIONAL BISON RANGE

Refuge Narrative Report

Calendar Year 1967

PERMANENT PERSONNEL

Joseph P. Mazzoni, Refuge Manager
Frank L. Kenney, Refuge Manager (Ninepipe)
John G. Augsburger, Assistant Refuge Manager
Victor B. May, Refuge Maintenance Foreman II
Grant Hogge, Heavy Duty Mechanic
Ernest W. Kraft, Maintenanceman III
Gladys C. Young, Clerk-Typist
Edward G. Krantz, Maintenanceman I, WAE
Robert L. Middlemist, Maintenanceman I, WAE
William L. Lampshire, Laborer, WAE
William P. Bradley, Student-Trainee

TEMPORARY PERSONNEL

Robert L. McVey, Laborer
Robert Watson Taylor, Laborer
Randell E. Evans, Summer Trainee (YOC)
Carol B. Howell, Summer Trainee (YOC)
Edmond G. Priddy, Maintenanceman I
Grant J. Hovde, Maintenanceman I
Lester R. Winn, Laborer

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January 1 to December 31, 1967

I. GENERAL

A. Weather Conditions

Weather conditions experienced during 1967 produced above average moisture during the critical growing season, and the driest summer and early fall period in the seventeen year recorded weather history of the refuge.

A total 6.30 inches of rainfall was recorded during April, May and June; 1.45 inches above the 15-year mean. Only .67 inches of rainfall was received during July, August and September, or 2.18 inches below the 15-year mean, while maximum daily temperatures soared into the high 90's. Thirty-four days with 90 to 103 degree temperatures occurred during July, August and September, a highly unusual amount of hot weather for the Flathead Valley. The result was one of the potentially most serious fire hazard seasons experienced in many years. Fortunately, lightning storms, our principle source of range fire, remained unseasonably scarce.

A total of 11.07 inches of precipitation was received during the year, or 1.67 inches less than the 15-year mean. Snowfall was generally quite light, with the greatest amount, 6.0 inches, recorded on March 11. The lowest recorded temperature was 3° below zero on December 12. Mild wintering conditions prevailed for all wildlife species.

B. Habitat Conditions

1. Water

Stored water reserves in the Flathead and Jocko Irrigation Districts were quite low at the beginning of the year, and every effort was made to replenish depleted supplies. As a result, the flows of the lower reaches of Mission Creek and the Jocko River fluctuated only slightly during the course of the year.

Water supplies originating on the refuge were generally quite adequate, although spring flows were sharply reduced by late August and early September. The upper Elk Creek and Beed Springs ceased flowing entirely for varying periods.

2. Food and Cover

The combination of ample moisture and warm temperatures during the April - June period, resulted in exceptionally good grass and shrub forage production. Although the hot, dry weather which followed

contributed to rapid plant maturity and minimum plant moisture for the balance of the summer, food supplies were more than sufficient throughout the year.

Grass seed production appeared quite good, and an abundance of immature plants were noted in all units during the various range inspections. Reproduction of browse species also continued at a desirable rate, and the amount of browsing noted was light to moderate throughout the range.

II. WILDLIFE

A. Migratory Birds

1. Waterfowl

Canada goose production was again poor. At least six pairs appeared to be establishing nesting territories early in the spring, but only two broods were produced. The first brood of five goslings was hatched on May 30, with the second hatched on June 1, bringing total refuge production to 12 goslings.

The resident Canada goose flock averaged near 30 birds most of the summer and early fall. From October to mid-December, hunting pressure elsewhere in the Flathead Valley increased the refuge flock to from 60 to 75 birds. At the end of the year, the resident flock had stabilized at about 25 birds.

Seven broods of ducks were recorded on the Ravalli Ponds; two broods of shovelers totalling 13, and five broods of cinnamon and/or blue-winged teal totalling 25. The brood count of Mission Creek was made quite late in the season and many early broods were probably not seen. The broods recorded on that stream were; one brood of ten hooded mergansers, one brood of 11 wood ducks, one brood of three common mergansers, and one brood of three mallards.

Duck use on refuge streams increased markedly when Ninepipe and the other reservoirs and potholes in the Valley began freezing in mid-November. A maximum population of about 1,500 mallards was reached on Mission Creek.

About 800 mallards, 30 common goldeneye and 20 common mergansers were using the refuge at the end of the year.

2. Other Water Birds

Great blue herons could be seen almost daily feeding along Mission Creek. The normal population was about three birds, with maximums of five or six on occasions.

3. Shore Birds

Killdeer were very common in the moist grassland areas and in the vicinity of the Ravalli Ponds. Spotted sandpipers and Wilson's phalarope were also common around the Ravalli Ponds,but no unusual concentrations were observed. The Wilson's snipe was seen frequently, but its available habitat is very limited and populations were small.

4. Mourning Doves

The first spring migrant was noted on April 4. Most resident birds had established nesting territories by the end of May. The refuge population peaked at about 200 birds. Most doves migrated south during the fall migration. However, two unusual sightings of single late season doves were made on November 7 and December 24.

B. Upland Game Birds

The ring-necked pheasant population remained relatively static. The small number of broods observed indicated fair hatching success, but poor survival. The maximum refuge population was estimated at 100 birds.

Gray partridge production was again very good, with broods of ten about average. The summer population was estimated at 1,500 birds.

Chukar partridges also experienced good production. Three broods, averaging ten chicks each, were observed in Trisky Canyon, and a covey of 30 was also seen in the Twin Canyons area. Survival into the winter was excellent.

Richardson's grouse production was about average. Three broods, totalling 13 chicks, were reported.

At least one ruffed grouse was seen on the refuge, for the first time since February 27, 1965. A single bird was observed on Headquarters Ridge on November 9 and 21.

C. Big-game Animals

1. Buffalo

Grazing use by bison was regulated in accordance with the three-month rotation schedule established by the 1964 range survey. This, of course, was the first full year under the deferred-rotation grazing program, formally initiated in October of 1966. No major problems were encountered, although animals occasionally had to be returned to units from which they had wandered via a disarranged gate or section of fence. Most trouble was again experienced with wire gates and the barbed wire contour fence through the Alexander Basin. However, one aluminum gate on the east division fence had to be replaced with a two by eight-inch-board gate after it had been virtually demolished and subsequently repaired three different times. The last time it was damaged, the animal/s had to break a heavy six-inch corral pole to get to it.

Grazing use and distribution were closely watched throughout the year, with SCS Range Technician Joe Zacek participating in a rather extensive two-day horseback inspection trip in May, and another cursory inspection during roundup in October. Light to moderate use was the rule in all grazing units, and the consensus was that the initial results of the program were excellent. Properly administered, this approach to bison grazing-management should be conducive to improved range conditions on a continuing basis.

A total of 407 animals was tallied during the annual roundup, October 5 through 12. This included a calf which accidentally killed itself in the corrals in May, and an injured five-year-old bull collected in September. The two range herds were worked through the corrals independently of one another, to minimize the calf-weaning problem and the job of selecting animals for two separate herds. The bulls were rotated from one herd to the other during the process, although certain adjustments were necessary in order to maintain the proper number of males in the respective herds. This was the first time the buffalo were worked in this manner, and it generally went quite smoothly.

John Corcoran, D.V.M. with the Animal Health Division, U.S.D.A., from St. Ignatius, and Livestock Inspector Bob Manlove, Missoula, were again on hand for the vaccinating and ear-tattooing work. The 41 heifer calves were vaccinated for brucellosis, and all calves branded with a "7" on the lower left hip and tattooed with a "V-7" inside the left ear.

U.S.D.A. officials had given some indication earlier in the year that brucellosis vaccination could be discontinued because of the brucellosis-free history of our herd. We were quite interested in this possibility , as an initial step towards the eventual discontinuance of branding and elimination of the need to "man-handle" calves during roundup. This consideration, of course, involves the relative value of known-age information as opposed to the undesirable esthetic qualities of permanent hot brands. However, we were subsequently advised that continuance of the vaccination program was deemed advisable, and would continue to be required.

U.S.D.A. officials also again required that all live-sale animals destined for inter-state shipment be individually identified with a metal ear-tag. Therefore, 34 of the 55 live-sale animals were worked through the squeeze chute and tagged. This was the largest group of animals worked in the squeeze since it was installed in 1966, and we were all relieved at the ease with which the operation was completed.

The first calf was noted on April 13. A total of 86 of the 89 calves born survived to the end of the year for an initial production of 85 percent from 105 cows of calving age, and a 97 percent calf survival. Two of the calves that died killed themselves in the corrals, one in May and one at roundup. The meat from these animals was salvaged. The third calf was also injured during roundup, and had to be destroyed. The animal was so seriously damaged from injuries apparently received both before and during roundup, that the carcass had to be discarded. Annual production data recorded since 1954 is summarized below:

ANNUAL CALF PRODUCTION, 1954 - 1967

Year	Production	Year	Production
1954	90%	1961	94%
1955	90%	1962	84%
1956	92%	1963	91%
1957	84%	1964	94%
1958	95%	1965	94%
1959	90%	1966	85%
1960	80%	1967	85%

The 1967 production was again considerably below the near 90 percent averaged during the past fourteen years. Although Leptospirosis pomona may be at least partially responsible for this decrease, Dr. Corcoran has expressed some feeling that other diseases may be implicated. This subject is discussed in greater detail in Section I., Disease.

At the conclusion of the roundup, Range Herd #1, consisting of 202 animals and approximately 168 animal units, was released into the Lower West Range. Range Herd #2, consisting of 120 animals and about 113 animal units, was released into the Lower South Range. The exhibition herd was comprised of five animals and four animal units.

A total of 107 cows of breeding age was returned to the range, as compared to 105 in 1966. The overall herd sex ratio was 49:51 (1:1.05), male:female, which represents a slightly greater proportion of males in the population than in previous years.

The bison butchering program commenced on November 27, and the total 21 animals remaining to be slaughtered had been processed by noon on November 29. The 1967 herd reduction totalled 80 animals. Herd composition at the end of the year was as follows:

BISON HERD COMPOSITION, DECEMBER 31, 1967

Age Groups	Male	Female	Total	Animal Units
Calves	44	42	86	25.8
Yearlings	18	19	37	25.9
2 year olds	19	14	33	30.2
3 year olds	32	17	49	53.7
4 year olds	12	12	24	
5 year olds	6	11	17	123.0 *
6 year olds	5	19	24	
7 year olds	7	8	15	
8 year olds	3	8	11	
9 year olds	2	9	11	
10 year olds	1	3	4	
11 year olds	0	2	2	12.0 *
12 year olds	0	3	3	
13 year olds	1	1	2	
4 plus	9**	0	9	14.4
Totals:	159	168	327	285.0

* Based on average weight data for 4 to 9 and 10 plus age groups.
** Exact age unknown.

2. Elk

The 1967 February big-game census yielded 52 elk observations. Based on this census and the previous year's estimate, the total refuge population was estimated at 60 head.

On June 8, a cow in the exhibition herd gave birth to twin calves, a rare occurence in elk. Twenty-seven calves were observed in the wild herd on September 30. This was the largest count of the year, and was used as the year's production estimate.

Three bull elk were found dead on the range; one adult and two yearlings. Both yearlings died as a result of having a leg entangled in a fence. The adult bull appeared to have died as a result of a horn wound received during the rut.

Two animals also died in the exhibition herd. A six-year-old cow died of an apparent bacterial infection. A two-year-old bull was not found in sufficient time to be autopsied. He was born in the fall, as a result of an earlier reproductive study, and had been in poor health for some time.

Twenty-nine head were removed during the annual disposal program; 17 adult cows, four yearling cows, and eight calves. The composition of the wild herd at the end of the year was; five adult bulls, four yearling bulls, 16 adult cows, five yearling cows and 19 calves. The composition figures are based on a known minimum number of adult bulls, the September 30 composition count, and disposal composition data.

The exhibition herd now consists of one $6\frac{1}{2}$-year-old bull, one $2\frac{1}{2}$-year-old bull, two adult cows, and the twin calves.

3. Mule Deer

The mule deer population at the beginning of the year was an estimated 200 head. The winter big-game count yielded a slightly higher total, but since considerable confusion developed in a critical inventory unit, the original estimate was retained.

The only known natural losses were two animals found during disposal, a $4\frac{1}{2}$-year-old buck and a male fawn. Cause of death was unknown in both cases.

In 1967 we continued experimenting with the deer composition counts in an effort to determine the most accurate means of sampling our deer population. Three counts were made during the year; August 22 and 23, October 12 and 13, and December 13 and 14. We had hoped that by the end of 1967 we could reach some definite conclusions regarding the results of the composition counts. We are particularly interested in the time of year which will yield the most accurate results. In an attempt to find these correlations, all of the composition data, since disposal 1965, was compiled and deer population data followed through.

There was insufficient correlation between the composition counts to reach any definite conclusion or establish any positive trends. Counts at varying times of the year will be needed for another year or more before any conclusion can be formulated. The only positive indications were; (1) late summer counts, August and September, yielded higher buck per doe ratios than pre-disposal, October, counts, and (2) in 1967, when the August and October counts were averaged and disposal figures subtracted, the resulting percentages nearly equaled those of the December counts. This second correlation suggests that we may have to consolidate two or more composition counts to obtain a true herd composition.

A small number of refinements were made during the 1967 counts. The problem of confusing adult and yearling does was simplified under the assumption that fawns will exhibit a 50:50 sex ratio and consequently the yearling age class should also be near 50:50. The yearling doe age class will then be considered equal in number to the observed yearling buck age class, and will be subtracted from the total number of does observed. As a result of this, the fawn production will be based on the fawns per total number of does.

Refuge objectives provide that the big-game herds will be representative of pristine, unhunted populations. Through manipulation of our herd structure, based on the pre-disposal composition counts and the annual control program, any desired composition can be maintained. To standardize herd management, a desired mule deer herd population structure was established.

No reference to pristine herd compositions could be found, so hypothetical natural herd compositions were computed from the Breeding Potential Tables of Unimpeded Increase Rate of Populations, from Game Management by Aldo Leopold, 1933. The resulting percentages were based on a 50:50 sex ratio; assumed does bear young at three years, and average one and one-half fawns per breeding doe. The percentage composition for the pre-fawn population computes at 36 percent adult bucks, 14 percent yearling bucks, 36 percent adult does and 14 percent yearling does.

Based on the October composition count, our 1967 fawn production was estimated at 114 fawns.

A total of 84 mule deer was shot during the 1967 disposal program. The composition was as follows; 11 percent adult bucks, 9 percent yearling bucks, 37 percent adult does, 7 percent yearling does, and 36 percent fawns.

The end of the year population was 228 head, with the following composition, as determined by the December composition count; 28 percent adult bucks, 7 percent yearling bucks, 37 percent total does, and 28 percent fawns. From this composition our pre-fawn 1968 population would be; 35 percent adult bucks, 14 percent yearling bucks, 37 percent adult does, and 14 percent yearling does. This is very close to our desired composition.

4. White-tailed Deer

A total of 200 white-tails were estimated at the beginning of the year. The big-game census in February yielded only 108 head. This was well below our estimate and probably well below the actual population. As a result of this census our total population estimate was revised to 175 head.

Eight losses occurred during the year; three adult bucks, one yearling buck, and two fawns were found along Mission Creek. Two bottle-fed fawns had to be shot as the result of broken necks from being frightened into fences.

White-tail herd composition counts were generally less satisfactory than those for mule deer. Attempts during late summer, and again during December, failed to yield adequate sized samples for any degree of confidence. A count on October 17 through 19 yielded 80 observations and provided the basis for the production estimate and disposal computation.

The purpose of the composition counts was the same as discussed under "Mule Deer".

In 1966, the procedure which provided the best sample was to observe large areas of habitat from a stationary lookout. In 1967, this procedure provided very few observations and greatly limited the success of the composition counts. Apparently a change in climatic and vegetation conditions changed the species' feeding habits.

The difficulty in obtaining representative samples of the white-tail population must be overcome if we are to gain any confidence in our composition figures. The mule deer have demonstrated a degree of variability, relative to time of year censused, and this must also be present in the white-tail populations.

The changes made in handling the yearling doe age class and the fawn:doe ratio in the mule deer counts have also been applied to the white-tails.

The desired composition percentages were established for the white-tail population in the same manner as the mule deer, but with a slight change in the basic assumptions. We again desired a 50:50 sex ratio, but assumed the does bred at two years of age and produced an average of one and one-half fawns per breeding doe. The resulting percentage compositions were; 33 percent adult bucks, 17 percent yearling bucks, 33 percent adult does, and 17 percent yearling does in the pre-fawn population.

The 1967 fawn production, based on the October composition counts, was computed at 80 fawns.

A total of 53 deer was shot during the disposal, with the following composition; 4 percent adult bucks, 9 percent yearling bucks, 52 percent adult does, 11 percent yearling does, and 24 percent fawns.

The end of the year population estimate was 200 head. An end-of-the-year composition was determined by subtracting the disposal removals from the October composition. This herd composition is; 23 percent adult bucks, 9 percent yearling bucks, 27 percent adult does, 8 percent yearling does, and 33 percent fawns. Assuming a 50:50 sex ratio in the fawns, the 1968 pre-fawn population will consist of; 32 percent adult bucks, 17 percent yearling bucks, 35 percent adult does, and 16 percent yearling does.

5. Bighorn Sheep

The sheep population was estimated at 62 head at the first of January. This was adjusted to 60 head after the February game census, for practical reasons.

Two known losses occurred during the year. A four-year-old ram was found dead on April 7, in Trisky Canyon. The condition was beyond autopsy and no cause of death was determined. On September 4, an 11½-year-old ram was collected that had been ailing since early spring, and he was near death. The carcass was sent to the University of Montana for autopsy, and was found quite free of parasites. The cause of its debilitated physical condition appeared to be advancing old age, complicated by an internal infection of unknown origin.

The composition of the sheep herd was computed on the basis of two sets of population samples; 456 random observations from the period September 1966 through June 1967, and 125 observations from three censuses, June through September 1967.

The 1966 or pre-lamb 1967 population was computed using both sets of samples. The two computations were quite comparable, with the maximum spread of three animals occurring in the ewe category. The average of the two computations, based on the population estimate of 60 head, for the 1967 pre-lamb was; 26 percent or 16 rams, 49 percent or 29 ewes, and 25 percent or 15, 1966 lambs. These computations compared quite favorably with the observed 1966 lamb production of 14.

The post-lamb 1967 population was computed only from the three 1967 summer counts. The composition of the refuge herd, based on the 125 observations and the total refuge population estimate of 71, was; 20 percent or 14 adult rams, 11 percent or 8 yearling rams, 43 percent or 30 adult ewes, 8 percent or 6 yearling ewes, and 18 percent or 13 lambs.

The computed production figure of 13 lambs was used as our total production for 1967. The end of the year population was estimated as 70 head.

We had planned to trap and remove 15 head of sheep during the fall or winter, but animals in the proper composition could not be captured in the Sheep Pasture. The desired number were finally confined to this unit at the close of the year, but the actual trapping project was postponed until the latter part of March 1968, and milder conditions on the release site.

6. Antelope

The pronghorn herd numbered 114 head at the first of the year. Four antelope died of natural causes or accidental death during 1967. One adult buck and one fawn were found dead on the range, and one doe was killed during trapping operations on November 2. A tame male fawn, "Sammie", was killed by dogs on February 22 at headquarters. Six does were also collected for the O'Gara reproductive physiology study during September and October. Total known losses by death in 1967 were 10 head.

A total of 32 fawns was produced during 1967. Our maximum summer population was 143 head.

As a result of the collection of 18 does during 1966 and 1967 for the O'Gara study, the sex ratio of the pronghorn herd had become imbalanced toward bucks. The composition in late October was 49 percent bucks, 28 percent does, and 23 percent fawns.

The refuge population had reached the established maximum level. Cooperative arrangements were made with the Montana Fish and Game Department for trapping 75 head. We succeeded in trapping 54 head on November 1, with the aid of a helicopter. Fifty-one head were donated to the Utah Department of Fish and Game for use in an antelope reproduction study; one adult buck was donated to the Charles M. Russell Game Range, Lewistown, for exhibition; one had to be destroyed because of injuries sustained in the trap; and one stunned fawn was released.

A large percentage of the trapped animals had been bucks, and our remaining population composition was greatly improved. At the end of the year, the total population was 83 head; 37 percent adult bucks, 32 percent adult does, and 31 percent fawns.

7. Rocky Mountain Goats

The mountain goat population increased from five to seven, with the addition of two kids. The herd now consists of one adult billy, three adult nannies, one yearling and two kids. The goats were rarely seen, except on infrequent occasions when they appeared on the ridge south of headquarters.

8. Longhorn Steers

The exhibition longhorn herd remains at four head, with no changes during 1967. Tom and Jerry are both showing signs of old age.

9. Black Bear

Black bears were seen a number of times during the year. Some were obvious transients, but it also appeared that two or three bears spent considerable time on the refuge. A sow and her cub were seen several times in the higher timbered areas near Highpoint.

The cub with the red collar, reported in 1966, apparently wintered on Mission Creek. It was also reported on several occasions

on Headquarters Ridge. Having been released on the Range as a cub, it may have adopted the Bison Range as its home.

D. Fur Animals, Predators, Rodents and other Mammals

Our coyote population continued to respond to protection. The number of sightings had increased greatly the last few months of the year, and were almost a common occurence. Three pups were produced at the Antelope Ridge den and were the only known production.

Three bobcats were seen during the year. A white-tail deer fawn found dead and partially covered with litter in the refuge picnic area was attributed to bobcats.

Dogs presented our only serious predation problem. Dog packs intermittently entered the headquarters area in the early morning to harass the tame and winter-fed deer and antelope. On February 22, "Sammie", a tame antelope fawn was killed. Other "pets" suffered lost patches of hair, cuts, and one broken nose. The removal of three dogs alleviated the problem.

At the end of the year, dogs were again beginning to enter the refuge, but none of the culprits were caught.

Feral housecats were found occasionally and disposed of, but generally caused few problems.

Badgers were seen on several occasions and their dens were well distributed over the grassland portions of the range. They presented no problems, except for two badgers that preferred to burrow in the tour road.

Striped skunks were occasionally observed on the refuge proper, but were most abundant in the headquarters area. A wintering group of 10 were removed from under the woodshed behind the manager's residence on February 27.

Six long-tailed weasels were seen during the year. Porcupines are becoming very common in several areas of the refuge. A limited amount of control may be necessary in areas of heavy damage near the tour road.

Yellow-bellied marmots were quite abundant in the refuge bone yard and took up residence in several storage buildings. The first reported sighting of the year was on March 23, near the Snake Pit.

Columbian ground squirrels were not abundant and no large colonies occurred on the refuge.

Yellow-pine chipmunks were the most obvious small rodent and occurred in most rocky, timbered areas of the refuge. The first sighting was on March 23 on the sun-warmed south side of the refuge. They remained active into November and the first snowfalls.

Mountain cottontails evidently experienced a good year. Cottontails were very common in the brushy stream bottoms and were abundant around the slaughterhouse and the bison corrals.

The meadow mice population experienced a die-off during the 1966-67 winter. The 1967 summer population was much reduced from the high density population of 1966. Pocket gopher sign was thinly scattered throughout the grasslands.

Beaver were not reported within the refuge on Mission Creek, and no fresh sign was seen this winter on the Jocko River inside the refuge.

E. Hawks, Eagles, Owls, Ravens and Magpies

Marsh hawks were common the entire year. Observations suggested that about ten pairs inhabited hunting territories during the summer.

Sparrow hawks were the most abundant hawks during the summer period. In the winter, between fall and spring migrations, sparrow hawk observations were uncommon.

Red-tailed hawks were the most common buteo during the summer period. Their niche was filled in the winter by rough-legged hawks, which migrate in from the north. Both of these species were common during their peak populations, and quite uncommon in the opposing seasons.

A peregrine falcon was seen on January 11, and one Cooper's hawk in February.

Golden eagles were year-around residents and small numbers were normally observed. The largest number reported in one day was five. Three immatures were observed giving chase to a mule deer fawn on September 14. The fawn eluded them by hiding in dense brush.

One bald eagle was reported several times in early March. This was the only observation during the year.

Great-horned and short-eared owls were observed several times throughout the year. One long-eared owl was reported on January 3.

Crows and ravens were common, but most observations involved birds passing across the refuge.

Magpies were abundant, as usual. Nesting success was very high, but within two months the total population was again about the same as the pre-nesting population. The surplus birds were either reduced severely by predation or emigrated from the refuge.

F. Other Birds

The most unusual small bird observations made during 1967 were; 2 Stellar's jays on January 6, 1 tree sparrow on January 6, 12 American

goldfinches on February 9, 1 house wren on February 21, 22 mountain bluebirds on March 23, 1 yellow-breasted chat on July 7, 1 Savannah sparrow on July 12, and 8 grey-crowned rosy finches on November 2.

The banding program was not carried out to the degree we had planned. Only 67 birds of 11 species were banded.

G. Fish

Nothing to report.

H. Reptiles and Amphibians

Fourteen rattlesnakes were reported during the year. Eight of these sightings were made at the snake pit during early October.

Painted turtles were common in the ponds and calm water areas along Mission Creek.

I. Diseases

1. Buffalo

No natural or disease-oriented losses occurred in the bison herd during 1967, a rather remarkable record. At least two separate calves and one yearling were observed in early August with varying degrees of lameness which appeared somewhat similar to symptoms associated with Pasteurella multocida infections. The two calves were field-treated with long-lasting penicillin and all three animals recovered. The lameness could easily have been injury-oriented.

A weak calf was discovered with a serious lesion and infection in its tongue on August 14. The infection had progressed to the point where sucking was causing extreme discomfort to the calf's mother. As a result, the cow rarely allowed the calf to nurse, and its condition had deteriorated rather badly. Field-treatment consisted of penicillin injections and cleaning and swabbing the tongue with iodine. This was repeated regularly over a two-week period, until the calf began to show definite improvement. The lesion appeared to be a self-inflicted bite wound caused, perhaps, by a kick from an older animal.

A slightly emaciated five-year-old bull was noted during the latter part of August, suffering from what Veterinarian Ray Keyser diagnosed as a broken penis. Dr. Keyser recommended that the animal be collected. However, we decided to wait a couple of weeks to see if the bull might show signs of recovery. Its condition gradually worsened, and it was finally collected on September 13. The massive infection surrounding the penis was found to have been caused by a horn wound immediately anterior to the penis. Although bison have unbelievable recuperative powers, it is doubtful that this animal would have survived. The infection was localized and didn't affect the meat, which was salvaged.

The development of an experimental vaccine for the control of Pasteurella multocida by Dr. K. L. Heddleston, Research Microbiologist, National Animal Disease Laboratory, Ames, Iowa, and subsequent research

with the vaccine on Bison Range animals by Dr. Cora Rust Owen, Research Microbiologist, Rocky Mountain Laboratory, Hamilton, Montana, was discussed in our 1966 report. At that time, Drs. Heddleston and Owen were both inclined to think that a regular program of vaccination would be advisable. However, in April of 1967, Dr. Heddleston expressed the opinion that vaccination is probably unnecessary unless P. multocida should begin to cause major losses. Should this occur, he is prepared to furnish us with a supply of vaccine. For the time being at least, we have no plans to inaugurate a vaccination program for this disease.

Blood samples were taken from the 21 buffalo butchered, and 20 were submitted through Dr. Corcoran to the Montana Livestock Sanitary Board Laboratory in Bozeman for Brucellosis, Leptospirosis and Anaplasmosis tests (one sample was lost when the sample bottle was accidentally broken). The samples all tested negative for Brucellosis. Two samples, one from an eleven and one from a fourteen-year-old cow, tested "suspicious" for Leptospirosis. However, Corcoran advised that this could have been a non-specific reaction which may have had little or no connection with the disease in question.

This was the first year that Bison Range buffalo were tested for the incidence of Anaplasmosis. The results were rather disturbing, as five animals tested suspicious. Unfortunately, Laboratory personnel had furnished Dr. Heddleston with a portion of each serum sample submitted, and there was insufficient serum for the complete testing procedure normally used for Anaplasmosis. Only the capillary tube agglutination test was made. The compliment fixation test, which apparently provides more specific information on samples which test suspicious in the capillary tube agglutination test, was not made. As a result, no definite conclusions may be drawn from these initial test results. The results may represent a non-specific reaction, or may be an indication that the disease does exist in our herd. We'll simply have to wait until further tests can be made beginning in 1968.

As noted earlier, this was the first time in fourteen years that calf production was below 90 percent in two consecutive years. We don't know necessarily that this should be cause for alarm. However, Dr. Corcoran has expressed the feeling that we may have one or more as yet unknown diseases present in the herd which may be implicated in this apparent reproduction "problem". One possible disease suggested was bovine vibriosis, "a venereal disease of cattle caused by Vibrio fetus and characterized by infertility and early embryonic death."

Vibriosis is apparently becoming a rather common problem in cattle in the Flathead Valley region, and could conceivably have been introduced in our herd. Unfortunately, the disease is rather difficult to diagnose in cattle, and would be extremely difficult to detect in bison. This discussion is pure speculation, of course, but it does emphasize the value of a regular blood testing program, and the need for continuing efforts to further define the nature and extent of disease problems in our animals.

Keratitis, or inflammation of the cornea, was unknown in our herd prior to 1966, and the occurrence of the first noticeable concentrations of face flies, Musca autumnalis DeGreer. In that year, two

animals in the exhibition herd developed the characteristic opaque corneas, with one eventually suffering ulceration of the cornea in one eye. In their September 1966 Monthly Letter, the Montana Livestock Sanitary Board commented that severe infestations of face flies had been reported in the Kalispell and Bitterroot areas, to the north and south of the Flathead Valley. Of the veterinarians reporting from those areas, it was further said that, "It is their observation that there is a definite corresponding increase of infectious keratitis in cattle.

The same kind of relationship began to develop on the refuge in 1967. Face fly concentrations appeared far greater than they had in previous years, and they caused considerable disturbance to the bison during the summer months, most notably in the form of physical irritation. A frequent tossing of the head, punctuated by rapid, upward rubbing movements of the face back towards the shoulders, and general restlessness within a herd, belied the presence of face flies. The extent to which the flies may have interrupted the animals' normal behavior was unknown, of course, but it was obvious that they made life miserable for them.

The insects were persistently massed about the eyes and, to a lesser extent, the face. Their feeding activities were accompanied by a clear discharge from the eyes which became crusted in the corner of the eye (near the tear duct region), and on the lower eyelid. The discharge was generally present whether the flies were actively feeding or not.

We didn't notice any eye discoloration, or advanced symptoms of keratitis, until roundup. At that time our crew on horseback ran into a large, adult bull with obvious symptoms of blindness in one eye. The animal was virtually impossible to manage, and eventually had to be left in the field.

During our corral activities, we were rather alarmed to find a total of seven animals with varying stages of eye discoloration and blindness. One four-year-old cow was afflicted in both eyes, with the cornea of one badly ulcerated, and was prone to hook blindly at other animals in the confines of the corral. One of our live animal buyers called us, after getting home with his animals, and advised that one yearling heifer had been discovered with "Pink Eye" in both eyes, one of which had ulcerated. This brought the total number of animals thus afflicted to nine.

Indications are that those animals with relatively minor eye damage experience only temporary impairment of their sight, and eventually recover. In some, the eye will become progressively worse without treatment until it ulcerates. Those in which the cornea actually ulcerates no doubt suffer permanent loss of sight.

The implications are obvious. In the absence of some form of natural regulating factor, or an effective artificial control measure, we can anticipate an increasingly serious problem with this insect in the future. Methods of control used experimentally thus far in the cattle industry in this area have generally not been too effective, nor practical for application to our situation.

2. Elk and Deer

Blood serum samples were submitted to the Montana Livestock Sanitary Board Laboratory from 29 elk and 124 deer collected during the fall disposal program. All species tested negative for Brucellosis. One $3\frac{1}{2}$-year-old cow elk tested as suspicious, and one $2\frac{1}{2}$-year-old female white-tailed deer tested as a reactor for Leptospirosis. The latter results are not unusual, as we know from previous tests that Leptospirosis is present in our deer and elk herds.

3. Bighorn Sheep

Tissue samples taken from the $11\frac{1}{2}$-year-old ram collected on September 4 were submitted to the Rocky Mountain Laboratory in Hamilton. Their report indicated that, "The plates from all specimens showed nothing of significance. Alpha streptococci was isolated in pure culture from the fluid taken from the abscess."

Dr. Albert G. Canaris, Associate Professor of Zoology, University of Montana, inspected the carcass for parasites. He advised that, "The bighorn sheep contained one Cysticercus tenuicollis attached to the rumen (adult is known as Taenia hydatigena and has been reported from Canidae), one stomach worm Osteragia circumcincta, female. The liver appeared to be in good condition except for the unidentified granular material in the larger bile ducts. If this granular material had been present in other parts of the liver, I would strongly suspect an old case of liver fluke." Dr. Canaris indicated that this animal had a surprisingly low level of parasitic infestation.

4. Antelope

A blood sample collected from the adult doe antelope which had to be destroyed during the live-trapping operation on November 1 tested negative to both Brucellosis and Leptospirosis.

5. Vegetation

Diptera cecidomyiidae larvae were again present in chokecherries in small numbers during the 1967 growing season, but were not sufficiently abundant or widespread to cause any serious damage.

An extremely heavy infestation of an unidentified tent caterpillar occurred, principally on chokecherry trees, throughout the refuge during the early summer months. The small chokecherry trees along the tour road east of Highpoint were completely stripped of their leaves by mid-July, and appeared quite dead by late summer. It will be interesting to note what long-term affect the feeding of this insect may have had on these plants.

III. REFUGE DEVELOPMENT AND MAINTENANCE

A. Physical Development

1. Refuge Work Program

a. Fence Construction and Repair

A 96-rod division fence was constructed in the bison exhibition pasture to permit grazing deferment of the deteriorated rangeland portion, comprising about 37 acres.

Complete renovation of nearly two miles of 7' big-game type fence, comprising the various bison holding pastures at the corrals, was completed. This also involved relocation of the fence along the north end of the west pasture, and virtually all of the north pasture fencing. The latter work was done to eliminate a considerable amount of unneeded fencing north of the slaughterhouse, and make room for the development of a parking area and truck turnaround. All posts were replaced with native juniper corner and brace posts and 10' steel line posts. Much of the existing wire was salvaged and utilized. Heavy wood gates were constructed and installed as required. During the course of the fencing work near the corrals, a concrete culvert was installed in the main approach to the corrals to eliminate a marshy bog that had been a hazard to horsemen. The culvert sections were acquired from excess sources a number of years ago.

The 1.4 mile division fence between headquarters and the slaughterhouse was also rehabilitated during the year. This project involved complete replacement of all fence material, as we took advantage of the opportunity to convert from the previous 7' big-game type design to the antelope-type design which has worked so effectively since it was first used in 1966. Most of the old woven wire was salvable, and will be used elsewhere on the range. The antelope-type fence design utilizes 7' T-type steel posts and 47" No. 9 woven wire, set 16" to 18" above the ground. New galvanized metal gates were installed.

The bison holding pasture east of the corrals was divided into two units with the construction of a 45-rod division fence. The main corral chute was slightly modified, and a small cutting gate installed, to facilitate cutting the herd into either of the two new holding pastures created. This allowed us to work each range herd independently of one another, which couldn't be practically done previously.

The extensive bison corral renovation work completed in 1966 was followed up this year with a preservative-stain application on all new wood. A mix of one gallon of stain to three gallons of penta seal was used.

The old, deteriorated deer-proof fence which formed the west boundary of the Quarters 2 grounds was removed and replaced with a neat appearing 300-foot fence relocated in a more favorable place.

All interior fencing was inspected at least once during the year, and repairs made as required, prior to the time bison were turned into the various range units. Several trees which fell on the boundary fence along the Jocko River were removed and necessary fence repairs made. The entire 23 miles of boundary fence were inspected and routine maintenance performed during the summer period.

b. Roads and Bridges

Following completion of the Job Corps Mission Creek bridge renovation job, gravel which had silted in around the west boundary flood gate on that stream was hauled and spread on the road extending north from the bridge to the refuge storage area. A three-inch layer, twelve feet in width, was applied on one-quarter mile of road. The bridge approaches were also raised at that time.

With the relocation of pasture fences north of the slaughterhouse, an area measuring approximately 150' x 300' was provided for development as a public parking area and turn-around for truck-tractor units. Considerable earth fill was required to enlarge the loading area; access was developed to and from the parking area; and the entire area, including the main entrance road to the corrals and slaughterhouse, was surfaced with a three-inch layer of river-run gravel.

All refuge roads were bladed once during the year to remove oversize rock and the annual accumulation of vegetation. The 19-mile tour road was covered two additional times with the rock rake.

c. Building Maintenance

Quarters No. 2: The kitchen, dinette room and bathroom were given two coats of paint. The old chicken house (not on real property) was razed and the area cleaned up.

Buildings Nos. 6 and 23: Exterior surfaces received two coats of paint, white with green trim.

Buildings Nos. 13 and 24: Exterior surfaces received one coat of paint, white with green trim. Building No. 24 was also placed on a concrete foundation, which eliminated the perennial problem with wintering skunks taking up residence beneath it.

Buildings Nos. 26 and 28: The slaughterhouse and hide house, respectively. The former received one coat of paint on the north and east exterior walls, and two coats on the south and west walls. The exterior of the hide house was given two coats of Portland cement paint, and the deteriorated window casings replaced and painted. The building painting was done by contract.

Building No. 29: The metal roof of the bison corral horse barn was given a coat of Portland cement paint, and the exterior walls painted. This was the first time that this building had ever been painted, and the colors used matched those on the nearby slaughterhouse and hide house.

Quarters No. 62: Filled and sanded nail holes, and painted interior of living, dining and bathrooms.

Building No. 77: The old metal granary received one coat of green paint on the roof and while on the walls.

Buildings Nos. 86-93: The eight public rest-rooms in the picnic area were given a coat of redwood stain inside and out.

d. Automotive Equipment Maintenance

Major repair and maintenance work accomplished included: installation of new short block in Jacobson riding mower; valve job and replacement of cracked head on I-49872; replacement of ring gear and pinion on I-75650; installation of new boom cable and overhaul of power unit transmission in P & H mobil crane, I-76918; replacement of #12 motor grader cab with new enclosed cab obtained from B.I.A., and painting of entire unit; installation of clutch and flywheel in I-53981; complete overhaul of Ford tractor engine, backhoe and front-end loader attachments; overhaul of TD-9 starter; with necessary minor repairs and 5,000-mile preventative maintenance checks as required.

e. Miscellaneous

A concrete spring collecting box and water trough were installed in the west pasture at the buffalo corrals. The old water hole was filled and leveled. Two additional water troughs were installed in conjunction with the pasture fence renovation work; one in the east pasture and one in the horse corrals. Water was obtained from the existing slaughterhouse line.

Five rock retention dams or "drops" were constructed in Mission Creek, near headquarters, to impede stream flow and retard bank erosion. The project involved about 100 cubic yards of rock hauled by contract. Approximately 100 cubic yards of rip-rap material was also contracted for streambank protection work on the Jocko River.

Blackfoot Cooperative telephone service was brought into the headquarters area from Charlo in March, and about 3¼ miles of the old St. Ignatius system was subsequently removed between the Highpoint Lookout and Ravalli Hill. The five miles of refuge-owned line between Ravalli Hill and St. Ignatius was relinquished to the Treasure State Telephone Co., which now operates in that area. Old telephone poles remaining in the head of Elk Creek, and south of the picnic area, were also removed and hauled in.

The large cottonwood trees in and around the Quarters No. 62 yard were topped to a height of about 30 feet. The willow trees east of the office were also topped.

Signs, self-service ticket and leaflet dispensing units, and other facilities required by the entrance fee program were

constructed and installed. Appropriate signs were also made for the Jocko and Ninepipe public fishing parking areas.

A self-service information booth was designed, built and installed near the office. The booth provided basic public information service before and after office hours, and appealed to a surprising number of casual-interest visitors. The booth contained leaflets and current items of interest; e.g., big-game population levels, specific things to see or look for, etc.

Supplies and materials in the storage area were sorted and rearranged, scrap was burned, scrap iron sorted and piled for sale, and the "bone yard" grounds generally cleaned up.

Irrigation, mowing and general maintenance and cleanup of headquarters grounds and the picnic area continued to consume much of our time, especially during the tourist season.

The irrigated portions of the bison exhibition pastures and the six-acre field west of Quarters No. 62 were treated with 33½-0-0 fertilizer on May 8, at the rate of 200 pounds per acre. A total of 36 tons of hay was later cut, baled and hauled to the barn from the various fields within the headquarters area. The economics of refuge hay production is rather questionable, and it appears likely that at least two of the smaller hay fields near the headquarters entrance will gradually be encouraged to revert to a native vegetative association.

2. Kickinghorse Job Corps Work Program

Refuge work projects completed or initiated during the year consisted of: (1) complete renovation of the Mission Creek bridge on the "bone yard" road at headquarters. The existing concrete piers were used, but all wood material was replaced with steel I-beam stringers and pressure-treated lumber. The refuge contributed supervisory personnel and the P & H mobil crane with operator; (2) development of the Jocko River Public Fishing Area access road and parking area. In addition to road and gravel work required, this project involved a railroad crossing, installation of a 20-foot cattleguard, removal of 300 feet of old big-game type boundary fence and construction of 500 feet of stock type fence, hauling and placement of natural rock vehicle barriers, and installation of two pit-type rest-rooms; and (3) sloping and revegetation of bank cut adjacent to the entrance road near Quarters No. 2, which was within two days of being completed when all Job Corps equipment was moved to another job. This project is to be completed in the spring of 1968.

A considerable amount of work was accomplished under this program on the Ninepipe and Pablo Refuges, and is discussed in the Narrative Reports for those areas.

B. Plantings

1. Trees and Shrubs

Slightly over 100 native juniper, cottonwood and aspen trees were transplanted from along Mission Creek and the Jocko River, and planted in bare areas adjacent to the headquarters entrance road and within the new fisherman access and parking area on the Jocko. The trees did quite well during the first month or so after being planted, but late summer mortality was quite high due to the lack of moisture which accompanied the hot weather of that period.

2. Upland Herbaceous Plants

About 50 cubic yards of accumulated barnyard manure and waste hay were hauled and spread on bare areas subject to sheet and gully erosion along the entrance and exhibition pasture tour roads. The results were excellent on all but the most severe slopes, with considerable grass seedlings and small weedy plants in evidence by midsummer. Paper and jute erosion control netting will be experimented with next year on some of the more difficult sites.

An extensive gully in the rangeland portion of the east bison exhibition pasture was filled and seeded to a mixture of native grasses. Although several loads of topsoil were spread over the area prior to seeding, initial germination was only fair on this dry site. About one-half mile of heavy clay canal ditch bank was seeded to crested wheatgrass in the two exhibition pastures. This seeding appeared to have gotten a fair start by mid-summer.

The badly eroded and totally unvegetated road cut in the County road 212 right-of-way adjacent to the refuge entrance was rehabilitated in cooperation with the Lake County road crew. The area was leveled, resurfaced with topsoil, and reseeded with a mixture of grasses. By late summer, a dense stand of vegetation had become firmly established.

C. Collections and Receipts

1. Seed and Other Propagules

Twenty-five pounds each of western wheatgrass and Kentucky bluegrass seed was purchased for use in a grass mixture for small erosion control reseeding projects. A small amount of both species was used in the reseeding discussed in earlier sections.

2. Specimens

The following specimens were all preserved for addition to the refuge collection:

Species	Number	Type
Robin	1	Study skin
Wilson's warbler	1	" "
Sparrow hawk	1	" "
Meadow lark	1	" "
Starling	2	" "
Bullock's oriole	2	" "
Bison	1	Head mount

The bird specimens were prepared by David Shackleton, Graduate Student engaged in bison research on the refuge during the summer. All birds were found dead, except the robin, which was collected under the refuge permit. The bison head was prepared by Robert Scriver, Browning, Montana, under contract.

D. Control of Vegetation

1. Biological Control

The goatweed beetle, Chrysolina quadrigemina, remained widespread throughout the goatweed infested areas on the refuge during 1967, but again failed to exert any significant degree of control.

The beetles introduced from California on June 2, 1966, obviously had little immediate effect on the resident population, and it appears doubtful that additional introductions will contribute in any significant way towards an increase in population numbers.

We are still no closer to knowing why the beetle has failed to reproduce in numbers equal to those in pre-1959 populations, than we were last year.

2. Chemical Control

The results of the goatweed spraying in the Pauline Creek drainage last year were generally as predicted. The degree of plant mortality appeared to be in direct proportion to the effectiveness of the applications. On the hard-to-spray rocky slopes, actual kill averaged 60 to 70 percent, but small isolated patches were frequently missed completely. Kills ranging to near 100 percent were evident in the more accessible areas.

Goatweed ground control efforts in 1967 were again centered in the Pauline drainage. We remain convinced that the only effective way to control this plant is to concentrate on one drainage at a time. However, the degree to which this plant has spread on the refuge makes ground application painfully slow and expensive. For this reason, essentially, we expanded our control efforts to include aerial application on the extensive infestations in the Alexander Basin area. We are hopeful that most of the initial control work between Headquarters Ridge (the north "boundary" of the Pauline drainage) and the East Switchbacks south of Antelope Ridge can be done aerially, with ground application providing the principle means for replicate treatments.

The aerial spray contractor did an excellent job of covering the area selected, although the initial kill was rather sporadic in the rugged upper elevation sections. The results in the bulk of the area looked quite promising, and it is anticipated that an average 80 to 90 percent kill may actually have been achieved. The pilot was especially conscientious about our instructions to avoid shrub and tree patches, and relatively little damage was sustained by these plants.

Canada thistle control was concentrated along roadsides. Although the initial results of control on this species with 2,4-D amine has generally always looked quite promising, the actual kill experienced in most cases is rather discouraging. It appears that Tordon 22K is about the only chemical available to us which does effectively control this species in this area.

E. Planned Burning

None.

F. Fires

The year 1967 was one of the worst fire seasons experienced in the history of the Pacific Northwest. We were extremely fortunate to have had only one small fire on the Range. A lightning strike on the evening of September 5 started the fire in a large ponderosa pine tree on Headquarters Ridge, immediately south of headquarters. Due to the quick response of refuge personnel and refuge neighbors, and a very timely lull in the wind, the fire was held to an area of about one acre.

IV. RESOURCE MANAGEMENT

A. Surplus Buffalo Disposal

1. Live disposal and meat sales

The tentative program appraisal prepared and submitted earlier in the year to appropriate reviewing officials has been embodied in the following discussion (in many cases verbatum), so that it may become a permanent record in this report. The initial appraisal was, of course, prepared prior to completion of the disposal program, and certain revisions and corrections have subsequently been made.

The disposal policy statement adopted following the Buffalo Management Workshop held March 6-9 at the Fort Niobrara Refuge, represented a basic departure from the long-established, existing program. The primary purpose of the new policies and procedures was to place the disposal program on a more sound economic basis, and minimize the ultimate need for a refuge slaughtering program.

The live sale and butcher animal quotas were established so as to maximize live disposal and minimize butcher disposal. The size of the butcher herd was determined by the approximate number of animals previously required annually to fill club requests. This automatically eliminated the extensive meat sale program involving individuals,

families, and commercial resale meat outlets - the first important phase in the slaughter reduction effort. The number of animals selected for this purpose indirectly established the size of the live sale herd.

Live animals were sold on the basis of a sealed competitive bid sale, issued August 7 and closed September 15. The animals were listed in lots of from one to five animals, and a minimum bid price of $200.00 per animal established. This made the sale attractive to buyers with limited financial means, yet guaranteed that the sale price would at least approach that which could otherwise be obtained through meat sales.

Bid awards for the 55 animals sold alive totaled $22,704.54, or an average of $412.81 per animal. The highest bid received was $700.00 for a yearling heifer; the lowest bid awarded was $250.00 for a yearling bull. A total of 39 individual bid forms was received, with the following distribution: Montana - 15; South Dakota - 4; Idaho - 4; Oregon - 4; Wyoming - 4; Colorado - 2; North Dakota - 2; California - 2; Utah - 1; and Ohio - 1. An additional bid received from a bidder in Washington was withdrawn. A detailed summary of the bid sale follows:

Lot No.	Quantity	Description	Price Bid	Consignee
1.	5	Long Yearling Bulls	$1,540.00	Durham Meat Company P. O. Box 668 Mtn. View, Calif. 94040
2.	5	Long Yearling Bulls	1,540.00	" " "
3.	2 3	Long Yearling Bulls Long Yearling Heifers	1,720.00	" " "
4.	2 3	Long Yearling Bulls Long Yearling Heifers	2,109.80	Mt. Haggin Livestock Co. P. O. Drawer 640 Anaconda, Montana 59711
5.	2 3	Long Yearling Bulls Long Yearling Heifers	2,109.80	" " "
6.	1 3	Long Yearling Bulls Long Yearling Heifers	2,000.00	Holland Ranch Company Bannack Star Route Dillon, Montana 59725
7.	1	Long Yearling Heifers	700.00	" " "
8.	1 2	Long Yearling Bull Long Yearling Heifers	1,265.88	Mt. Haggin Livestock Co. P. O. Drawer 640 Anaconda, Montana 59711
9.	1 2	Long Yearling Bull Long Yearling Heifers	1,265.88	" " "
10.	1	Long Yearling Bull	250.00	Durham Meat Company P. O. Box 668 Mtn. View, Calif. 94040

Lot No.	Quantity	Description	Price Bid	Consignee
11.	1	Long two-year-old Bull	$ 356.18	R. W. Gregory Longmont, Colo. 80501
12.	4	Long two-year-old Bulls	1,740.00	Durham Meat Company P. O. Box 668 Mtn. View, Calif. 94040
13.	1 3	Long two-year-old Bull Long two-year-old Cows	1,935.00	" " "
14.	1	Long two-year-old Cow	457.00	Harry Pon P. O. Box 1191 Burns, Oregon 97721
15.	1 4	Long two-year-old Bull Long two-year-old Cows	2,440.00	Durham Meat Company P. O. Box 668 Mtn. View, Calif. 94040
16.	1 2	Long two-year-old Bull Long two-year-old Cows	1,275.00	" " "

A letter of explanation was sent to each individual and commercial meat applicant advising of the program changes, and preparing them for the anticipated discontinuance of this aspect of the meat sale program. Although we were reasonably certain that no meat would be available for such applicants, we couldn't be sure until sales to clubs and organizations had been finalized. Approximately 420 individual and commercial applications were received.

We had originally not planned to subject the club meat applications to a public drawing until next year, but the 45 applications received exceeded the amount of meat available. An explanatory letter was prepared and sent to each club as soon as the need for a drawing became apparent, and the drawing was held on October 2. The clubs' reaction to this procedure was quite favorable. Fortunately, the availability of the calf mentioned earlier and a club cancellation made it possible to fill all remaining applications. However, the drawing did serve to prepare the clubs for the eventuality of public drawings in the future.

The age and sex composition of the 23 buffalo counted in the butcher disposal group was as follows:

Age	Male	Female	Total
14 years old		1	1
12 years old		2	2
11 years old		3	3
5 years old	1		1
4 years old		1	1
3 years old	4	5	9
2 years old	1	3	4
Yearling		1	1
Calf	1		1*
Totals:	7	16	23

* One of the two calves killed at roundup. The calf killed in May was sold to a local butcher shop and not counted as part of the disposal quota.

The following list summarizes total disposal program costs and sales receipts. For comparative purposes, revenue-cost data computed on the basis of program procedures used prior to 1967 is also presented. There was a total of 77 animals involved in the disposal, but two donated to the Flathead Tribe for distribution to local schools have been disregarded in the computations. There would normally have been three scheduled butcher animals donated for this purpose, in accordance with earlier Secretarial instructions. However, a calf which broke its neck in the chutes at roundup was salvaged and used as one of the donations.

1967 DISPOSAL PROGRAM COST ANALYSIS

1967 PROGRAM PROCEDURES

55 live sale, competitive bid		$ 22,704.54
Less $15/animal program costs		- 825.00
	Subtotal:	21,879.54
20 butcher animals @ $240/animal		4,800.00
Less $45/animal program costs		- 900.00
	Subtotal:	3,900.00
	Total Net Sales Receipts :	25,779.54
	Average Net Per Animal :	343.73

PRIOR PROGRAM PROCEDURES

35 live yearlings @ $235/animal		8,225.00
Less $20/animal program costs		- 700.00
	Subtotal:	7,525.00
40 butcher animals @ $240/animal		9,600.00
Less $70/animal program costs		- 2,800.00
	Subtotal:	6,800.00
	Total Net Sales Receipts:	14,325.00
	Average Net Per Animal :	191.00

TOTAL ADDITIONAL GROSS RECEIPTS RECEIVED IN 1967	$ 9,679.54
AVERAGE ADDITIONAL GROSS PER ANIMAL	129.06
PROGRAM COST SAVINGS REALIZED IN 1967.	1,775.00
TOTAL ADDITIONAL NET VALUE OF 1967 SALES ANIMALS	11,454.54
AVERAGE ADDITIONAL NET PER ANIMAL	152.73

The 1967 cost estimates have been adjusted downward on the basis of estimated reductions in direct and indirect disposal costs resulting from the changes adopted. The major savings may be attributed to the elimination of individual meat sales and the relative simplicity of the new live sale program. We previously had to deal with 400 to 600 individual meat applicants, 250 to 400 buyers, and a host of casual inquiries. Additional savings may be anticipated as the transition from past to current procedures is completed.

Despite the extra work required to facilitate program changes, the entire disposal program was far simpler to administer than it ever has been in the recent past. Disposal involved only two sales, with five live animal buyers and 44 club meat buyers.

The public reaction to program changes was entirely favorable, despite the widespread popularity of individual meat sales. Although several people expressed disappointment at no longer having the opportunity to purchase meat, only one voiced disapproval, in the form of a letter to Congressman Arnold Olsen. However, the majority of people contacted expressed strong support for our efforts to minimize the slaughtering program. It became evident that many people have an inherent distaste for a commercial-type slaughtering program involving wild animals, particularly when such a program impinges upon their traditional concept of a National Wildlife Refuge.

The procedural changes initiated this year resulted in a much more efficient and economical disposal program. Their use also provided the needed break from the fixed nature of past procedures, and set the stage for the kind of administrative flexibility which we should have in the development of our annual programs.

The essential nature of the 1967 program is to be continued next year, with increased emphasis on live sale disposals. Although the live auction sale approach used at Fort Niobrara Refuge during the year resulted in somewhat higher sales receipts, we plan to continue with the sealed bid approach for, essentially, the following reasons: (1) we feel that a sealed bid sale will provide for a more stable market and outlet for surplus animal disposal; (2) we like the relative simplicity of the sealed bid sale, and the fact that sales are completed prior to roundup; (3) with a sealed bid sale, we feel that the first year simply serves to establish a sale price, and are optimistic that a higher average sale price may be anticipated next year; (4) we feel there is less possibility for buyer collusion with sealed bid sales; and (5) our corrals are currently not adequate for the needs of an efficient auction sale.

2. Sale and Donation of Hides

Bison hide sales involved one head mount and one imperfect hide from the 1966 program, and four hides from the current program. One three-year-old bull hide was donated to Mr. Ernie McDonald, Conservation Officer, U. S. Forest Service, Portland, Oregon, and one five-year-old bull head mount was donated to the Amador County High School, Sutter Creek, California. The balance of the 1967 hides are to be sold on the basis of a sealed competitive bid sale in February 1968.

3. Sale and Donation of Skulls

Sales were limited to one three-year bull skull. Six additional skulls were donated to the University of Western Ontario, London, Ontario, Canada; Central Michigan University, Mount Pleasant, Michigan; West High School Biology Department, Billings, Montana; and Mr. McDonald, mentioned above.

B. Surplus Elk and Deer Disposal

1. Meat Disposal

Twenty-eight elk and 136 deer taken during fall disposal were again shipped to Montana schools for use in the hot lunch program. One elk was provided the County Extension Office for use in the Lake County 4-H Council Junior Fair, in accordance with prior authorization. A handling charge of 10¢ and 15¢ per pound of dressed meat was charged for deer and elk, respectively, to help defray costs of collection. Estimated comparative costs for the collection of these species are summarized below:

	Deer			Elk		
	1965	1966	1967	1965	1966	1967
Cost/Animal	13.88	12.86	11.77	31.96	35.14	20.53
Revenue/Animal	7.44	5.94	8.48	28.25	27.65	34.12
Difference:	-6.44	-6.92	-3.29	-2.71	-7.49	+13.59
Cost/# to Collect	.15	.19	.18	.12	.15	.10
Revenue/Pound*	.08	.09	.13	.11	.12	.16
Difference:	-.07	-.10	-.05	-.01	-.03	+.06

*Includes handling charge plus average receipts from sale of hides.

The increase in the 6¢ deer and 10¢ elk handling charge assessed last year was the principle reason for the improvement in the cost per animal:revenue per animal ratio. However, the number of animals taken, and the rather unusual ease with which they were taken, was also a factor in the case of elk.

The handling charge made to the State of Montana is the only source of revenue over which we have any control. Therefore, an additional 5¢ per pound charge will be considered for deer in 1968.

2. Sale of Elk and Deer Hides and Antlers

A total of 12 elk hides and no deer hides were sold during the year. A variety of antlers from both species were sold, principally to visitors on the area.

C. Proceeds of Sales

Total receipts from sales for the period January 1 through December 31, 1967 were as follows:

Live buffalo	$22,704.54
Butchered buffalo	4,833.75
Deer and elk meat	1,814.35
Hearts and livers	3.50
Buffalo hides	137.50
Elk hides	30.25
Deer hides	39.50
Deer tails	5.25

Skulls and antlers	$ 66.50
Employees horse-grazing fees	26.00
Employees wood purchases	42.00
Marsh concession	598.31
L&WC entrance permits	4,829.68
Sale of scrap	54.50
Sale of surplus, used property	30.11
Sale of used vehicles	1,352.50
Total:	$36,568.24

V. FIELD INVESTIGATION OR APPLIED RESEARCH

A. Antelope Reproductive Physiology Study

Refuge involvement in this study by graduate researcher B. W. O'Gara, University of Montana, is now complete, as is 50 percent of the laboratory work. Six animal collections were made on the Range during 1967, bringing the total for the study to 32. The doctoral dissertation is expected to be completed by June 1968.

B. Antelope Behavior Study

Graduate investigator Peter T. Bromley, University of Montana, completed his field work in October 1966. Copies of his Master of Arts thesis, "Pregnancy, Birth, Behavioral Development of the Fawn, and Territoriality in the Pronghorn (Antilocapra Americana Ord) on the National Bison Range, Moiese, Montana", were received on July 17, and distributed to the appropriate offices.

C. Buffalo Weight Studies

1. Age-Weight Relationships in October

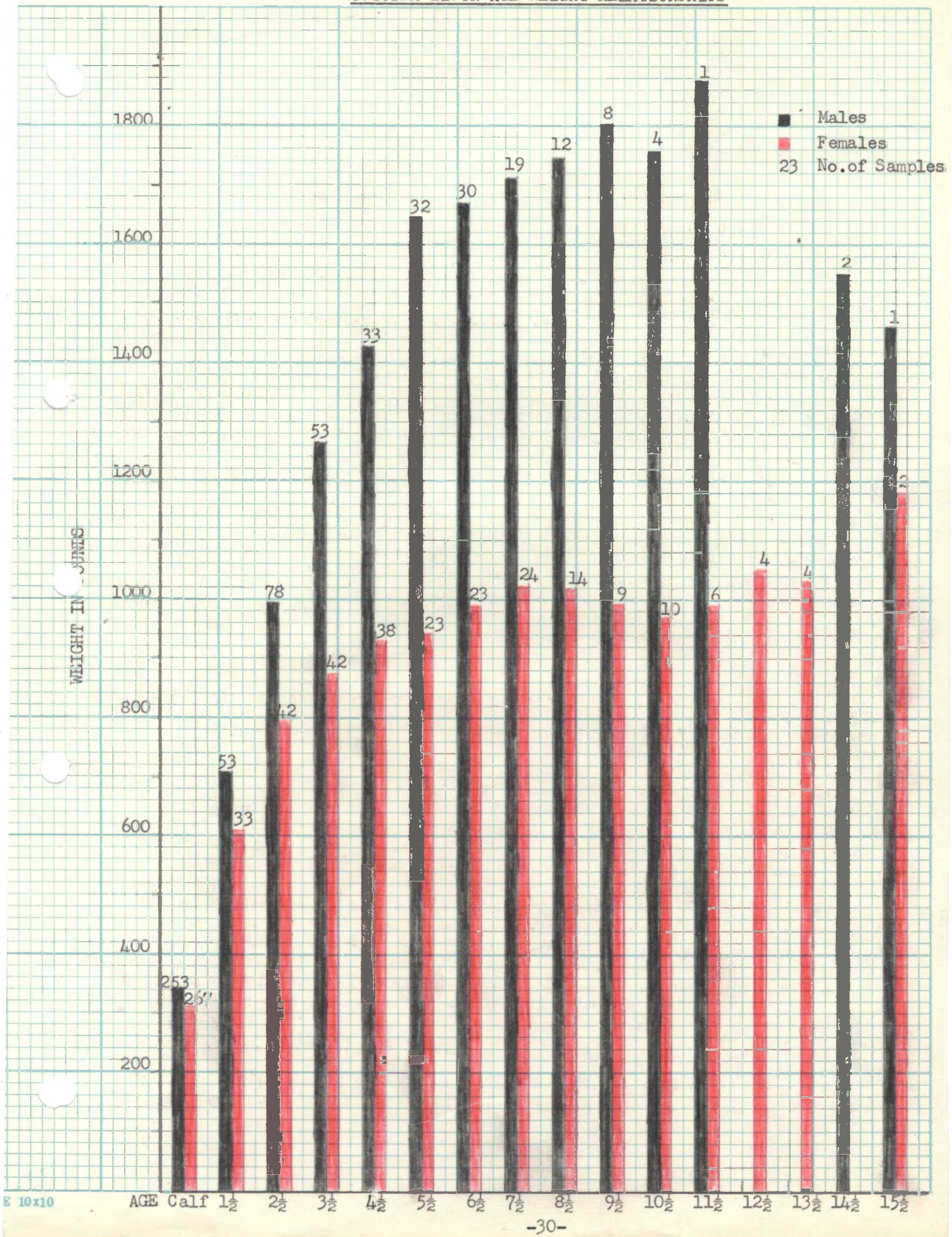
Weights taken during the annual roundup in October were discontinued following roundup in 1966 pending an analysis of data accumulated. The relationships established by 1,120 individual weights (579 bulls and 541 cows) taken in October of 1957, 1958, 1959, 1962, 1963, 1965 and 1966 are presented in the bar graph on page 30. Weight data from the years 1960, 1961 and 1964 could not be used in the analysis for various reasons. However, weights taken at roundup for the weight and longevity study, from 1963 through 1966, were incorporated.

The number of samples was generally adequate for bulls through age four, and cows through age seven. However, it is evident from an evaluation of the computed standard error and sample sizes that additional samples are required in the older age groups to establish the validity of this data. These samples will be accumulated during the course of future roundups, beginning in 1968.

2. Age, Weight and Longevity

The collection of information for this special study was continued during roundup. Seventeen of the 27 animals originally branded

OCTOBER BISON AGE-WEIGHT RELATIONSHIPS



with a special identifying mark were weighed, as compared to 18 last year. It appears doubtful that more than about 21 of these animals remain in the herd.

3. Live-Carcass Weight Relationships

Data pertinent to this study is routinely collected during the course of annual surplus animal slaughtering programs in early December. An analysis of 498 individual bison weight samples (298 bulls and 200 cows, consisting of both live and carcass weights for each animal) is illustrated in the bar graph on page 32. The weights were taken from 1957 through 1966 disposal records.

The carcass weights averaged 53.5 percent for bulls, 54.1 percent for cows, and 53.8 percent for both sexes as a group.

D. Buffalo Measurements

It was our intention to discontinue this particular study in 1967. However, an initial appraisal of information accumulated indicated possible variations attributable to changes in personnel responsible for making and recording the measurements. Although we know that considerable variation does exist within the same age and sex groups, the data does suggest that standard criteria of measurement may not have been consistently used. Therefore, this study is to be continued, with necessary precautions to avoid this possible source of error.

E. Buffalo Pregnancy and Lactation

Information collected for this study during the period 1951 through 1966 was summarized and evaluated. Because every effort was made to select dry or otherwise non-productive cows during the culling process, the 377 samples involved were not randomly selected. Therefore, this accumulated data is not generally representative of refuge bison, and has limited value.

The information does have value for possible correlation with the incidence of diseases which affect productivity and, for this reason, will continue to be recorded.

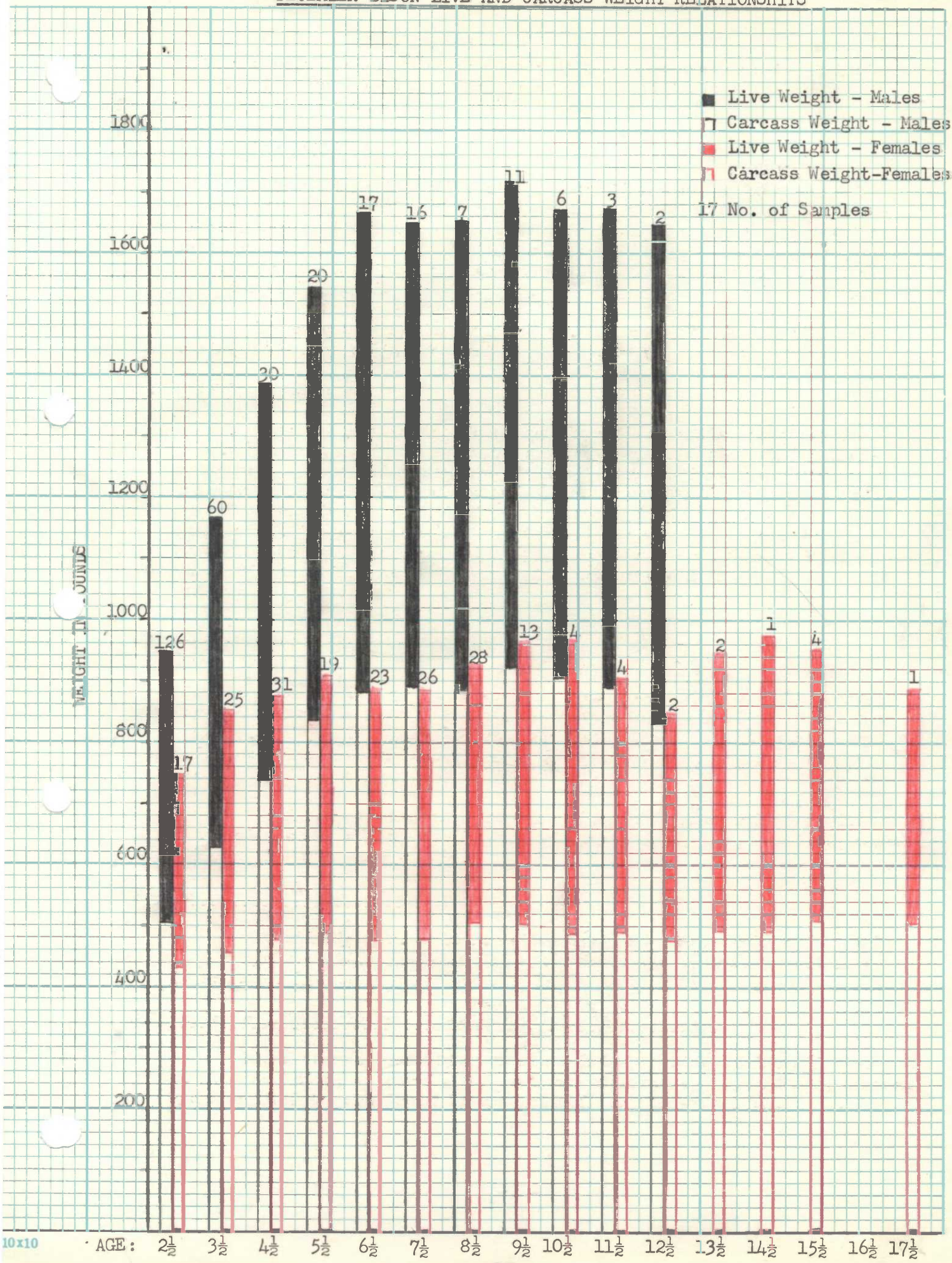
F. Sexual Behavior of Bison

Investigator Dr. Dale F. Lott was able to spend only a few weeks in the field on this long-term study. His first progress report is due in November 1968.

G. Ecological Comparisons of Social Organization in Bison

Field work on this study was completed by student investigator D. M. Shackleton, University of Western Ontario, London, Ontario, Canada, and the final report is to be completed in May or June 1968.

DECEMBER BISON LIVE AND CARCASS WEIGHT RELATIONSHIPS



H. Behavior of Cow and Calf Bison

Field work on this study was also completed by the student investigator, J. Engelhard, Central Michigan University, Mount Pleasant, Michigan, and the final report is to be completed by June 1968.

I. Average Weights and Weight Relationships of Deer and Elk

The collection of field data was discontinued, pending an analysis of accumulated information. The analysis is scheduled for completion in 1968.

J. Refuge Herbarium

Field work for the special study of refuge flora, conducted by Dr. John H. Thomas, Curator, Dudley Herbarium, Stanford University, Stanford, California, was essentially completed during the summer of 1966. However, additional plant collections were made this summer in a final effort to complete the vegetative representation.

Plant identification work was completed at the end of the year, and the last of nearly 400 specimens (representing as many species) were received for the refuge herbarium while this report was being prepared. The initial mounting work preparatory to placing these specimens in the refuge herbarium was completed on approximately 100 species by the young lady employed as a YOC during the summer months. The balance of this work should be completed in 1968.

Dr. Thomas plans to submit this study for publication in the Journal of the California Botanical Society early in 1968. Copies of his paper, which will include a complete checklist of native and introduced refuge vascular plants, will be submitted to appropriate Bureau offices at that time.

K. Range Condition and Trend

As indicated earlier, SCS range personnel continued to participate in annual range inspections and grazing program evaluations. With District Range Conservationist Joe Zacek now headquartered in Missoula, somewhat more frequent, informal range inspections are possible.

Our plans to establish a permanent, comprehensive system of grassland and browse transects as a basis for long-range trend studies were left unfulfilled. Only two complete Parker three-step grassland transects were established. The cooperative arrangements made with Montana State University personnel in 1966 did not materialize satisfactorily, and were terminated. Similar arrangements were subsequently made with University of Montana range specialists, and it is hoped that this important project can be completed in the spring of 1968.

L. Range Interseeding Study

The plots established in 1966 were "read" by Range Extension Specialist Don Ryerson and his field crew from Montana State University.

Although a progress report was anticipated late in the year, Mr. Ryerson's extended illness terminated further work on this project. With his subsequent return to the teaching staff at MSU, the future of this study is somewhat in doubt.

M. Elk Conception Date Study

A cooperative study was initiated this year with Mr. Kenneth Greer, Wildlife Biologist, Montana Fish and Game Department, Bozeman Wildlife Investigation Laboratory, concerning the conception dates of Bison Range elk. Mr. Greer is conducting similar studies in several elk herds within the state, and is interested in comparing the results and exploring the reasons for possible variations. Reproductive tracts and the lower jaws from adult cows removed during the fall disposal program were collected and sent to Mr. Greer for aging, etc. This study will eventually provide us with some rather interesting information, and is to be continued for an indefinite period.

N. Reintroduction of Columbian Sharp-tailed Grouse

In May of 1966, we began to explore the possibility of reintroducing the native Columbian sharp-tailed grouse, Pedioecetes phasianellus columbianus, to the Bison Range. This subspecies was once widely distributed throughout the Pacific Northwest, but is now absent from most of its former range. This former native of the Flathead Valley was last observed on the refuge in 1950. The last known remnant population of Columbians in Montana is found in the Kootenai River drainage near the Canadian border, in an area which apparently may be indirectly affected by the impoundment created by Libby Dam.

A cooperative reintroduction project was subsequently proposed to the Montana Department of Fish and Game, and later approved by their Commission, involving birds from the state of Idaho (the only source of Columbians in sifficient numbers to trap that we were aware of outside of British Columbia, Canada). Following an exchange of correspondence and various negotiations which have spanned a period of one-and-a-half years, we received word as this was being written that final agreement has been reached on an exchange of Montana turkeys for Idaho Columbians. Through the joint cooperation of the Fish and Game Departments of the two states, it now appears that this project will successfully culminate with a reintroduction of Columbians to the Bison Range early in 1968.

VI. PUBLIC RELATIONS

A. Recreational Uses

The total of 67,000 people estimated to have visited the refuge during the year represents a 17 percent decrease in visitation from that recorded the previous year. This rather unexpected reduction was no doubt largely the result of the new entrance fee requirement initiated, and, to a lesser extent, somewhat more refined methods of estimating total visitation (i.e., more liberal use of automatic car counters).

As might be expected, the most obvious decrease occurred in local visitation. The Bison Range headquarters area has been a recreational

focal point for local people within a fifty-mile radius. With the inauguration of an entrance fee, use by such people virtually ended.

Although the self-service daily entrance permit dispensing center installed on the entrance road solved many of the problems experienced with our tour fee progran last year, it also discouraged many potential visitors by requiring that they pay before they had a chance to either see or be told what they were paying for. Cars turning around on the entrance road at the dispensing center were a common occurrence throughout the fee collection period, June 1 through September 30.

Considerable adverse public reaction was also stimulated by the fact that the headquarters area visiting hours (and, therefore, the daily entrance fee collection period) were much longer than the self-guiding tour hours. Thus, a person paying the entrance fee at 5:00 or 6:00 p.m. was being charged as much as the person who arrived earlier during the period when the tour route was open, or between the hours of 8:00 a.m. and 3:30 p.m.

The dispensing center depended upon an honor system and proper interpretation of posted instructions for success. Unfortunately, one or the other was less than successful. We were rarely able to reconcile the number of accountable tickets dispensed with the amount of money received. In most cases, the former exceeded the latter. Surprisingly, however, the reverse sometimes occurred.

The obvious solution to these kinds of problems would appear to have been the provision of a manned reception booth at the entrance to the area. Unfortunately, this approach simply couldn't be economically or practically justified.

The entrance fee requirement is to be discontinued beginning in 1968, and will be replaced with a user fee for the self-guiding tour route. This should eliminate the source of the most serious problems experienced this year.

The greatest period of use occurred during the months of June through September, when 74 percent, or over 49,000 visitors, were recorded. The highest monthly total occurred in July; the lowest in January. It was interesting to note that, while the distribution of visitor origins was generally quite similar to that recorded last year, people from Montana comprised 10 percent less of the total visitation than they did in 1966 - a further confirmation of the observed reduction in local use. The number of persons per car averaged 4.14.

Use of the self-guiding tour route was estimated to have more than doubled that which occurred during the first year of the program, 1966. No major problems were experienced, although the prolonged dry weather did foster excessively dusty road conditions, and resulted in a level of big-game inactivity which did not meet with general public approval. Tourists quite often expressed discontent with the dust and the fact that animals were not easily seen from the tour road.

A quick check of the comments written on the self-registration form dispensed at the main entrance revealed that 72 percent commented favorably; 10 percent felt the tour route closed too early in the day; 6 percent were disappointed for a variety of reasons; 5 percent were unhappy with the amount of game seen; 2.5 percent complained about dust; 1 percent felt their time spent on the area was not worth the fee charged; etc. The criticism of the tour closing time was certainly a valid one, considering big-game habits. Consideration will be given to leaving the tour route open later in the day beginning in 1968.

Sales of the annual Golden Eagle entrance permit totaled $1,358.00. Sales of the $1.00 and 50¢ daily entrance permits totaled $3,471.68. Total administrative costs for the 1967 fee collection program were estimated at $2,900.00.

B. Refuge Visitors

Jan. 3 W. Ashton Brann, M&E, Helena (numerous visits)
Jan. 9 John Corbett, Law & Order, Flathead Agency (numerous visits)
Jan. 30 Ingvard H. Eide, Prof. Photographer,and W. C. Steurerwald, USFS, Missoula (movies for Lewis & Clark Expedition film)
Jan. 31 Wayne Chattin, Flathead Agency, Dixon (numerous visits)
Feb. 1 James L. Badura & Bernie Yednock, Kickinghorse Job Corps, Ronan (numerous visits)
Feb. 1 Faye Couey, MF&G, Kalispell (numerous visits)
Feb. 7 John C. Jones, Wash. D.C., & Frank Jacox, RO Portland (inspection)
Feb. 9 Dr. Raymond Keyser, Veterinarian, Ronan (numerous visits)
Feb. 22 Jim Posewitz, MF&G, Helena (Re/Clark Fork Drainage Study)
Feb. 23 Dr. Adolph Stebler & Gerry Atwell, Research Unit U of M, Missoula (numerous visits)
Feb. 24 Robert Murphy, Free Lance Writer, Phila. Pa.,(information & tour)
Mar. 2 Don Brown, MF&G, Kalispell (courtesy visit)
Mar. 15 Harold D. Roberson and Al Rennie, Flathead Agency, Dixon (introduce new superintendent)
Apr. 6 Clem Rose, SCS, Hot Springs (several visits)
Apr. 6 Ben Gates, State Employment Service, Polson (several visits)
Apr. 13 Les Sonders and Ray Pratt, State Weed Specialists, Bozeman, and Robert Racicot, Sanders Co. Agent, Thompson Falls (check goatweed)
Apr. 17 Joe Zacek, SCS, Great Falls (several visits)
Apr. 26 Dr. Piet Sevenster, Leiden, Netherlands (visit & photography)
Apr. 27 Ray Booker, BIA, Dixon (Re/grazing agreement at Ninepipe & Pablo)
Apr. 29 Prof. Melvin Morris, U of M, Missoula (numerous visits)
May 13 B. P. Tilakaratna & party, Ceylon, Acting Ambassador to United Nations (tour of range)
May 24 Ed Bratton, County Extension Agent, Ronan (numerous visits)
May 25 Nick Mariana, Regional Office, Portland (visit)
June 10-July 27 Mr. & Mrs. Allen D. Cruickshank, Audubon Society, Indian River, Florida (bird photography)
June 14 George Wiseman, RO, Portland (courtesy visit)
June 16 Robert Lambeth, State Game Warden, Polson (numerous visits)
June 19 Dr. Don Ryerson & crew of 11 girls to clip plots in Range Interseeding Study, State Extension Service, MSU, Bozeman
June 28 J. O. Jackson, George Takesgun, Sharon Oldelk and Micky Oldcoyote, Crow Agency (study of buffalo corrals and holding pens)

June 29 Dale Morgan, Spokesman-Review, Spokane, Wash. (photography)
July 5 John A. Fleming, USCSC, Missoula (inquiry)
July 6 Gerald Brown and Tom McDonald, BIA, Dixon (several visits)
July 15 Dr. Deyrol E. Anderson, KSPS-TV, Spokane (tour & photography)
July 20 Richard E. Highfill, BOR, Wash., D.C. (examine fee situation) with Stanley B. Olson, BOR, Seattle
July 26 James McLucas, MF&G, Helena (numerous visits)
July 27 Marvin Plenert & Bob Burkholder, CMR, Lewistown (aerial antelope census)
Aug. 1 Dr. & Mrs. W. E. Green, Biologist BSF&W, Winona, Minn.(visit)
Aug. 6 Alfred K. Peterson & party, Promotional Films Inc., Hopkins, Minnesota (tour to take movies)
Aug. 11 Don Helm, BSF&W Fish Hatchery, Miles City (collect bass at N.P.)
Aug. 27 Leonard Lee Rue III, Columbia, N.J., (photos for illustrating Murphy's refuge books)
Aug. 28 George Wiseman, Ass't. Regional Supervisor, Portland (inspection)
Sept. 8 Dr. Albert G. Canaris, Zoology Dept., U of M, Msla. (cooperative parasitology work)
Sept. 9 Arnold Bolle, Dean of Forestry, U of M, and Maarten C. Bolle (no relation), News Correspondent, The Netherlands (tour)
Sept.22 Mr. & Mrs. Frank Rose, Msla., Bison Range Manager 1923-30, (range tour - first visit since he left in 1930)
Sept. 24 Mr. & Mrs. Mel Ruder, Hungry Horse News, Columbia Falls (numerous visits)
Sept.28 Vern Craig & Hector LaCasse, MF&G, Helena (photography)
Sept.29 Clifford Hendrickson, Glenn Bingham, Bill Roberts, Stuart Fryburger & Nick Herak, farmer delegation from Charlo, (requested release of water from Ninepipe for irrigation)
Sept.29 Dr. John Corcoran, U.S.D.A., St. Ignatius (numerous visits)
Oct. 2 -10 Joe Van Wormer and Ed Parks, free-lance writers & photographers, Bend, Oregon (buffalo roundup and photography)
Oct.4-6 Dan Snyder, KRTV, Great Falls (several visits)
Oct. 6 K. A. Eggensperger, Sanders Co. Ledger, Thompson Falls (photos)
Oct. 9 Robert Larsson, Missoulian Correspondent, St. Ignatius (photos)
Oct. 9 Dr. J. Howard Slack, Helena, and Robert Manlove, Msla., USDA Veterinarian and Livestock Inspector (vaccinate buffalo calves)
Oct. 19 Vic Eklund, BOR, Seattle (Re/Wildlife Island study)
Oct. 23 Dr. John Craighead, U of M, and Dr. Joe Hickey, U of W (tour)
Oct. 24 Dr. Richard Taber, U of M, and Dr. A. S. Leopold, U of C (visit)
Nov. 1 Don Eastman & Brian Clapp, British Columbia F&G, Canada (watch antelope roundup)
Nov. 2 Earl Sparks & Jesse Nelson, F&G, Utah (truck antelope to Utah)
Nov. 14 Norton R. Miner, BSF&W, Billings (bait preparation)
Nov. 28 Ed Parks, Bend, Oregon, Author & Photographer (material for articles)
Nov. 30 Keith Seaburg, I&E Officer, MF&G, Msla. (photography)
Dec. 1 Bill Browning, Mont. Chamber of Commerce, Helena (photography)

C. Refuge Participation

Mazzoni

Jan. 31 Assisted with Charlo Community Blood-Typing Program.
Feb. 2 Attended Western Montana Fish and Game Ass'n. Executive Committee luncheon meeting and evening general meeting.
Mar. 18 Transported Charlo High School students, and participated as judge at District Science Fair in Hamilton, Montana.

Mar. 20 -21	Attended State Extension Service sponsored weed control meeting in Missoula.
Mar. 23	With Kenney, attended evening general meeting of Western Montana Fish and Game Association in Missoula.
Apr. 5	Attended Lake County Weed Control Board annual meeting in Ronan.
Apr. 19	Keynote speaker at Charlo High School Honor Society initiation.
Apr. 22 -23	Attended District 1 Montana Wildlife Federation annual convention in Columbia Falls.
Apr. 29	Attended annual Polson Outdoors, Inc. banquet in Polson.
May 15	Participated in Lake County Conservation Day program as tour guide and speaker.
May 22	Keynote speaker at Dixon High School graduation.
June 2, 3 & 4	Attended annual Montana Wildlife Federation convention in Great Falls.
June 27	Appeared on KGVO-TV program, "Big Sky Playground", for 15 minutes of slides and interview.
Sept. 14	Attended Western Montana Fish and Game Ass'n. Executive Committee evening meeting in Missoula.
Sept. 29	Met with Charlo Community farmers relative to Ninepipe water at public meeting in Charlo.
Oct. 17	Participated as member of Bureau of Outdoor Recreation island study team, for field inspection and report on Wild Horse Island, Flathead Lake.
Misc.	Presented illustrated talks and films to eight organizations and groups in the local area. Numerous talks and tours for groups on refuge. Attended regular meetings of Charlo Lions Club, and served as Third Vice-President, Tail-Twister and Chairman of Publicity and Program committees of that organization. Served as Chairman of the Nominating Committee for the 1967 officers of the Montana Chapter of the Wildlife Society.

Augsburger

Mar. 22	Served as judge at St. Ignatius Elementary School Science Fair.
Nov. 16	Participated in Federal Placement Program, University of Montana.
Misc.	Presented numerous talks and tours for groups on refuge.

Bradley — Presented several talks and tours for various groups on refuge.

May

Feb. 17	Attended Federal Businessmen's Association luncheon in Missoula.
Aug. 22	Attended Coordinated Wage Board Survey organizational meeting in Missoula.
Oct. 24	Appeared on KRTV, Great Falls, for interview and discussion of roundup.
Misc.	Presented six film programs to various schools, organizations and groups in the local area. Numerous talks and tours for groups on refuge.

Hogge — Presented illustrated talk to Charlo 4-H group, and numerous talks and tours for groups on refuge.
Served as Scout Master of Troop 56, Charlo (13th year).
Chairman of District Leadership Training Committee, BSA.
Member Western Montana Council Leadership Training Committee, BSA.
Chairman of District 28 School Board.

Kraft Presented illustrated talk to Spokane Trail Riders group, and numerous talks and tours for groups on refuge.
Served as coach for Charlo-Moiese Baseball Association, Little League team.

Middlemist Presented talk and tour for one group on refuge.
Served as Chairman of District 9 School Board.

D. Hunting

There is no public hunting on the Bison Range. General waterfowl and upland game bird hunting conditions in the Flathead Valley have been discussed in the Ninepipe and Pablo Narrative Reports.

E. Fishing

The public fishing program on the Jocko River was enhanced this year with the construction of an access road and parking area by the Kickinghorse JCC. This area provides the only public access to about six miles of excellent trout waters along the south boundary of the Bison Range.

F. Violations

No known violations occurred in 1967.

G. SAFETY

Scheduled SAFETY meetings, and the main topics of discussion were:

Jan. 9 Hand tool SAFETY was the topic of discussion, and a slide series on Hand Tool SAFETY was shown.
Feb. 6 Subjects from Fire Service Training Course on fire-fighting and fire-fighting SAFETY were discussed.
Mar. 7 Subjects from Civil Defense Course on Personal and Family Survival were presented.
Apr. 3 The movie "About Fallout" was shown, and Civil Defense topics discussed.
May 2 SAFETY precautions for use of refuge equipment and tools were discussed.
June 5 The topics of highway and vacation, and boat and water SAFETY were discussed.
July 5 The films "You are the Lifeguard" and "Play Ball, Play Safe" were shown.
Aug. 7 Building and range fire prevention and fire SAFETY were the topics of discussion.
Sept. 5 The film "Carrier or Killer" was shown, and driving SAFETY was discussed.
Oct. 2 Family and Home SAFETY, and the dangers of carbon monoxide poisoning were discussed.
Nov. 7 The SAFETY Sentinel issue on winter driving was discussed, along with Section 24 AM 1.4 of the Administrative Manual.
Dec. 4 The film "SAFETY Everywhere All the Time" was shown and buffalo butchering and deer and elk disposal SAFETY reviewed.

Quarterly fire drills were held on January 9, June 13, October 25 and December 11.

Two accidents occurred during the year. Medical attention was required in both cases, but only the first involved lost time. The first accident involved a cut hand incurred while installing a lawn mower blade. The second involved a cheatgrass seedhead which was blown into an employee's ear while he was eating lunch on a fencing project. Accident-free days at the end of the year totaled 129.

Refuge personnel attended four SAFETY courses during 1967. The International Fire Service Training Course, sponsored by the Flathead Indian Agency, Dixon, January 16 through 19, was attended by Victor B. May, Grant Hogge and Ernest W. Kraft. The Civil Defense School on Personal and Family Survival, sponsored by the U. S. Forest Service in Missoula on March 6 was attended by John G. Augsburger and Mr. Kraft. Another Civil Defense meeting on Community Planning on March 30, at Thompson Falls, was attended by Mr. Augsburger. The Defensive Driving Techniques Course, sponsored by the Forest Service in Missoula on May 3, was attended by Messrs. May, Hogge, Kraft, Krantz and Middlemist.

VII. OTHER ITEMS

A. Items of Interest

1. Training

In addition to the SAFETY-oriented training courses discussed above, refuge personnel participated in the following training sessions during the year:

Feb. 13 -16	Mazzoni, Kenney and Augsburger attended the Bureau Regional Conference in Portland, Oregon.
Apr. 16 -May 19	Kenney and Augsburger participated in the Basic Refuge Manager's Training Course at Arden Hills, Minnesota.
Sept.18 - 21	The Banding and Law Enforcement Workshop held in Klamath Falls, Oregon was attended by Mazzoni, Kenney and Augsburger.
Oct. 25	Hogge and Lampshire participated in a small engine trouble-shooting and major overhaul workshop in Missoula, sponsored by Pruyn, Inc.
Nov. 14 - 15	Foreman May attended a U. S. Forest Service course in Basic Supervision, held at the Ninemile Ranger Station, Huson.
Dec. 4-8	Clerk Young attended the Bureau Regional Clerical Workshop in Portland, Oregon.

The refuge organized and administered an observer training program for the benefit of Mr. Frank Minja from Tanzania, Africa, during the period August 22 through September 21. He was attending the University of Montana under the sponsorship of the Agency for International Development preparatory to a career in wildlife administration in his homeland.

Mr. Minja's principle interests were in political and social science, but his country had required that he major in wildlife management as a condition of its financial support. During the fall of 1967,

he again endeavored to obtain approval for a change in his major field of study. When he failed, he changed anyway - rejecting all financial support. At the end of the year, he was planning to support himself with a dish-washing job at the University, and looking forward to, "doing it the hard way, as many American students must", (while apparently still keeping the channels open to appropriate officials in the Tanzania embassy).

On the surface, it might appear that the Bureau's efforts to provide Mr. Minja with on-the-job training experience in wildlife management and administration were wasted. Considering that Tanzania's (and Africa's generally) major wildlife management problems are essentially social problems, and that Mr. Minja is a young man gifted with intelligence, perception and understanding, we believe that any efforts expended on his behalf were entirely worthwhile.

2. Personnel Awards

Mrs. Young was awarded a Quality Increase on October 18, 1967, in recognition of her initiative, resourcefulness, and general work performance.

3. Miscellaneous

A total of three teenage boys and two girls were assigned to the Bison Range through the Tribal-affiliated Neighborhood Youth Corps summer work program. Their salaries were paid by the sponsoring agency, with the refuge providing work projects and supervision for a 32-hour work week. We were extremely pleased with the manner in which these youngsters conducted themselves on the job, and are hopeful that we may again participate in the NYC program next year.

B. Credits

Mazzoni - those sections and items not listed below.

Augsburger - Section II, A; B; C-2, 3, 4, 5, 6, 7, 8 and 9; D; E; F; G and H. Basic data for Section V, C-1, 3; D; E; and the graphs on pages 30 and 32; Section VI, E; F; and G; NR-2, 7 and 12; mounted photographs.

May - summary of accomplishments and cost data for Section III and IV, B.

Hogge - summary of accomplishments for Section III.

Young - summary of sales receipts, etc., for Section IV, A, B and C. Typed and edited entire report.

All personnel contributed to collection of field data essential to the preparation of this report.

C. Photographs

Credit for the various photographs is given in each caption.

SIGNATURE PAGE

Submitted by:

(Signature)

Refuge Manager
(Title)

Date: January 31, 1968

Approved, Regional Office:

Date: MAR 25 1968

(Signature)

Assistant Regional Director
(Title)

3-1752
Form [illegible]2
(April 1946)

UPLAND GAME BIRDS

1613

Refuge National Bison Range Months of January to April, 19 67

(1) Species	(2) Density		(3) Young Produced		(4) Sex Ratio	(5) Removals			(6) Total	(7) Remarks
Common Name	Cover types, total acreage of habitat	Acres per Bird	Number broods obs'v'd.	Estimated Total	Percentage	Hunting	For Re-stocking	For Research	Estimated number using Refuge	Pertinent information not specifically requested. List introductions here.
Ring-necked Pheasant	2,000 A. grasslands and bottoms	40			Unknown				40	Some movement to and from adjacent farmland.
Chukar partridge	6,000 A. mixed cover	80			"				60	
Gray partridge	12,000 A. mixed cover	30			"				350	
Richardson's grouse	2,000 A. conifer type	28			"				60	
Ruffed grouse	300 A. brushy stream bottoms	?			"				?	Not observed on Range proper since 2/27/65

Remarks: Extremely mild winter conditions prevailed. No indication of major population change since last report period. Allowance made for normal winter population attrition. Population estimates based on general field observations only.

INSTRUCTIONS

Form NR-2 - UPLAND GAME BIRDS.*

(1) SPECIES: Use correct common name.

(2) DENSITY: Applies particularly to those species considered in removal programs (public hunts, etc.). Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge; once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: spruce swamp, upland hardwoods, reverting agriculture land, bottomland hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.

(3) YOUNG PRODUCED: Estimated number of young produced, based upon observations and actual counts in representative breeding habitat.

(4) SEX RATIO: This column applies primarily to wild turkey, pheasants, etc. Include data on other species if available.

(5) REMOVALS: Indicate total number in each category removed during the report period.

(6) TOTAL: Estimated total number using the refuge during the report period. This may include resident birds plus those migrating into the refuge during certain seasons.

(7) REMARKS: Indicate method used to determine population and area covered in survey. Also include other pertinent information not specifically requested.

* Only columns applicable to the period covered should be used.

3-1752
Form [illegible]
(April 1946)

UPLAND GAME BIRDS

1613

Refuge **National Bison Range** Months of **May** to **August**, 19**67**

(1) Species	(2) Density		(3) Young Produced		(4) Sex Ratio	(5) Removals			(6) Total	(7) Remarks
Common Name	Cover types, total acreage of habitat	Acres per Bird	Number broods obs'v'd.	Estimated Total	Percentage	Hunting	For Re-stocking	For Research	Estimated number using Refuge	Pertinent information not specifically requested. List introductions here.
Gray Partridge (288.1)	**12,000 A. mixed cover**	**8**		**1150**	**Unknown**				**1,500**	**Some movement to and from adjacent grasslands.**
Chukar Partridge (288.2)	**6,000 A. mixed cover**	**40**		**90**	**"**				**150**	
Richardson's Grouse (297)	**2,000 A. conifer type**	**20**		**40**	**"**				**100**	
Ruffed Grouse (300)	**300 A. brushy stream bottoms**	**?**		**?**					**?**	**Not observed on range proper since 2/27/65**
Ring-necked Pheasant (309.1)	**2,000 A. grass-lands & bottoms**	**20**		**60**					**100**	**Some movement to and from adjacent farmlands.**

INSTRUCTIONS

Form NR-2 - UPLAND GAME BIRDS.*

(1) SPECIES: Use correct common name.

(2) DENSITY: Applies particularly to those species considered in removal programs (public hunts, etc.). Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge; once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: spruce swamp, upland hardwoods, reverting agriculture land, bottomland hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.

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(4) SEX RATIO: This column applies primarily to wild turkey, pheasants, etc. Include data on other species if available.

(5) REMOVALS: Indicate total number in each category removed during the report period.

(6) TOTAL: Estimated total number using the refuge during the report period. This may include resident birds plus those migrating into the refuge during certain seasons.

(7) REMARKS: Indicate method used to determine population and area covered in survey. Also include other pertinent information not specifically requested.

* Only columns applicable to the period covered should be used.

3-1752
Form [illegible]
(April 1946)

UPLAND GAME BIRDS

Refuge National Bison Range Months of Sept. 1 to Dec. 31, 1967

(1) Species	(2) Density		(3) Young Produced		(4) Sex Ratio	(5) Removals			(6) Total	(7) Remarks
Common Name	Cover types, total acreage of habitat	Acres per Bird	Number broods obs'v'd.	Estimated Total	Percentage	Hunting	For Re-stocking	For Research	Estimated number using Refuge	Pertinent information not specifically requested. List introductions here.
Gray Partridge (288.1)	12,000 A. mixed cover	24			Unknown				1,000	Some movement to and from adjacent grasslands.
Chukar Partridge (288.2)	6,000 A. mixed cover	120			"				50	Poor early winter survival indicated.
Richardson Grouse (297)	2,000 A. conifer Type	30			"				70	
Ruffed Grouse (300)	300 A. brushy stream bottoms	60(?)			"				5(?)	On 11/9 and 11/21, one ruffed grouse was observed on Hdqts. Ridge.
Ring-necked Pheasant (309.1)	2,000 A. grasslands and bottoms	25			"				80	Some movement to and from adjacent brushlands.

INSTRUCTIONS

Form NR-2 - UPLAND GAME BIRDS.*

(1) SPECIES: Use correct common name.

(2) DENSITY: Applies particularly to those species considered in removal programs (public hunts, etc.). Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge; once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: spruce swamp, upland hardwoods, reverting agriculture land, bottomland hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.

(3) YOUNG PRODUCED: Estimated number of young produced, based upon observations and actual counts in representative breeding habitat.

(4) SEX RATIO: This column applies primarily to wild turkey, pheasants, etc. Include data on other species if available.

(5) REMOVALS: Indicate total number in each category removed during the report period.

(6) TOTAL: Estimated total number using the refuge during the report period. This may include resident birds plus those migrating into the refuge during certain seasons.

(7) REMARKS: Indicate method used to determine population and area covered in survey. Also include other pertinent information not specifically requested.

* Only columns applicable to the period covered should be used.

3-175[illegible]
Form [illegible]-3
(June 1945)

BIG [illegible]E

Refuge **National Bison Range** Calendar Year **1967**

(1) Species	(2) Density	(3) Young Produced	(4) Removals				(5) Losses				(6) Introductions		(7) Estimated Total Refuge Population		(8) Sex Ratio
Common Name	Cover types, total Acreage of Habitat	Number	Donation to F Agency	For Re-stocking	Sold	For Research	Predation	Disease	Winter Loss	Accidents	Number	Source	At period of Greatest use	As of Dec. 31	M:F
Bison	**15,600 A. grassland**	**89**	**1***		**75***					**4***			**407**	**327**	**49:51**
Elk	**5,000 A. timber & grassland**	**27**			**29**					**3**	**1**	**MontlF&G**	**88**	**56**	**39:61**
Mule Deer	**10,000 A. timber, brush & grassland**	**114**			**84**				**1**	**1**			**314**	**228**	**47:53**
White-tailed deer	**4,000 A. timber, brush & grassland**	**80**			**53**		**1**		**1**		**(5)**	******	**255**	**200**	**48:52**
Bighorn Sheep	**8,000 A. timber & grassland**	**13**						**1**	**1**				**72**	**70**	**39:61**
Antelope	**6,000 A. grassland**	**32**		**52**		**6**	**1**			**1**			**143**	**83**	**54:46**
Mtn. Goat	**2,000 A. timber**	**2**											**7**	**7**	**Unknown**
Texas Longhorn Steers	**40 A. pasture**												**4**	**4**	

Remarks: * **The 4 accidental losses included one 5-Yr.old bull collected following serious goring, and 3 calves killed in the corrals; meat from the bull and 1 calf donated to Flathead Agency; 1 calf sold locally, and 1 calf discarded.**

** **Five fawns brought in from various sources & bottle raised. Three survived to end of year. These deer not considered in range herd-population computations.**

Reported by **Joseph P. Mazzoni, Refuge Manager**

INSTRUCTIONS

Form NR-3 - BIG GAME

(1) SPECIES: Use correct common name; i.e., Mule deer, black-tailed deer, white-tailed deer. It is unnecessary to indicate sub-species such as northern or Louisiana white-tailed deer.

(2) DENSITY: Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge: once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: spruce swamp, upland hardwoods, reverting agriculture land, bottomland hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.

(3) YOUNG PRODUCED: Estimated total number of young produced on refuge.

(4) REMOVALS: Indicate total number in each category removed during the year.

(5) LOSSES: On the basis of known records or reliable estimates indicate total losses in each category during the year.

(6) INTRODUCTIONS: Indicate the number and refuge or agency from which stock was secured.

(7) TOTAL REFUGE POPULATION: Give the estimated population of <u>each species</u> on the refuge at period of its greatest abundance and also as of Dec. 31.

(8) SEX RATIO: Indicate the percentage of males and females of each species as determined from field observations or through removals.

3-175
Form NR-4
(June 1945)

SMALL MAMMALS

Refuge National Bison Range Year ending April 30, 1967

(1) Species	(2) Density		(3) Removals					(4) Disposition of Furs						(5)
								Share Trapping						
Common Name	Cover Types & Total Acreage of Habitat	Acres Per Animal	Hunting	Fur Harvest	Predator * Control	For Re-stocking	For Re-search	Permit Number	Trappers Share	Refuge share	Total Refuge Furs Shipped	Furs Donated	Furs Destroyed	Total Popula-tion
Coyote	15,000 A. all habitat	1,500			None									10
Bobcat	" "	3,000			"									5
Striped skunk	2,500 A.stream bottom	30+			12									75
Badger	10,000 A. grassland	400			1									25
Beaver	100 A. stream bottom	20			None									5
Mink	" "	10			"									10
Muskrat	50 A. wetland	1+			"									30
Marmot	2,000 A. mixed habitat	20			"									100
Porcupine	4,000 A. mixed habitat	200			"									20
Raccoon	100 A. stream bottom	10			"									10
Columbian ground squirrel	5,000 A. grassland	25			"									200

* List removals by Predator Animal Hunter

REMARKS: (1) 10 wintering skunks removed from under Qtrs-62 wood shed on 2/27/67. An additional two animals removed from around headquarters buildings during the year.
(2) One badger removed from bison exhibition pasture following development of extensive holes and general soil disturbance.
(3) Population estimates based on general observations only.

Reported by Joseph P. Mazzoni, Refuge Manager

INSTRUCTIONS

Form NR-4 - SMALL MAMMALS (Include data on all species of importance in the management program; i. e., muskrats, beaver, coon, mink, coyote. Data on small rodents may be omitted except for estimated total population of each species considered in control operations.)

(1) SPECIES: Use correct common name. Example: Striped skunk, spotted skunk, short-tailed weasel, gray squirrel, fox squirrel, white-tailed jackrabbit, etc. (Accepted common names in current use are found in the "Field Book of North American Mammals" by H. E. Anthony and the "Manual of the Vertebrate Animals of the Northeastern United States" by David Starr Jordan.)

(2) DENSITY: Applies particularly to those species considered in removal programs. Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge; once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: spruce swamp, upland hardwoods, reverting agriculture land, bottom land hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.

(3) REMOVALS: Indicate the total number under each category removed since April 30 of the previous year, including any taken on the refuge by Service Predatory Animal Hunter. Also show any removals not falling under headingslisted.

(4) DISPOSITION OF FUR: On share-trapped furs list the permit number, trapper's share, and refuge share. Indicate the number of pelts shipped to market, including furs taken by Service personnel. Total number of pelts of each species destroyed because of unprimeness or damaged condition, and furs donated to institutions or other agencies should be shown in the column provided.

(5) TOTAL POPULATION: Estimated total population of each species reported on as of April 30.

REMARKS: Indicate inventory method(s) used, size of sample area(s), introductions, and any other pertinent information not specifically requested.

INTERIOR--PORTLAND, OREGON

NR-6 Bureau of Sport Fisheries and Wildlif

PUBLIC RELATIONS

(See Instructions on Reverse Side)

Refuge **National Bison Range** Calendar Year **1967**

1. Visits
   a. Hunting **None** b. Fishing **670** c. Miscellaneous **600** d. TOTAL VISITS **67,600**

1a. Hunting (on refuge lands) **None**

TYPE	HUNTERS	ACRES	MANAGED BY
Waterfowl			
Upland Game			
Big Game			
Other			

Number of permanent blinds _____

Man-days of bow hunting included above _____

Estimated man-days of hunting on lands adjacent to refuge _____

1b. Fishing (area open to fishing on refuge lands)

TYPE OF AREA	ACRES	MILES
Ponds or Lakes		
Streams and Shores		1.5

1c. Miscellaneous Visits

Recreation **67,000** Official **500**

Economic Use **100** Industrial _____

2. Refuge Participation (groups)

TYPE OF ORGANIZATION	ON REFUGE NO. OF GROUPS	ON REFUGE NUMBER IN GROUPS	OFF REFUGE NO. OF GROUPS	OFF REFUGE NUMBER IN GROUPS
Sportsmen Clubs			5	600
Bird and Garden Clubs				
Schools	29	1,290	9	1,380
Service Clubs			3	80
Youth Groups	10	550	1	30
Professional-Scientific	3	15		
Religious Groups	1	20	2	60
State or Federal Govt.	4	30	4	180
Other	18	420	8	610

3. Other Activities

TYPE	NUMBER	TYPE	NUMBER
Press Releases	85*	Radio Presentations	
Newspapers (P.R.'s sent to)	4	Exhibits	1
TV Presentations	2	Est. Exhibit Viewers	200

* **Estimated total news articles in various local and regional newspapers dealing with the refuge.**

3-1756
(Rev. 4/63)

INSTRUCTIONS

Item 1: Total of a, b, and c, equal d.

"Visit" - definition. Any person who is on refuge lands or waters during a day or part thereof for the purpose of: hunting, fishing, bird-watching, recreation, business or economic use, official visit, or similar interest. INCLUDE - those who stop within the refuge while traveling on a public highway because of an interest in the area. EXCLUDE - persons engaged in oil or other industry not directly related to the refuge, persons using refuge as most direct route or principal avenue of traffic, and those boating on navigable rivers or the Intercoastal Canal, unless they stop to observe wildlife on the refuge.

Computing visits. Where actual counts are impractical, "sampling" is used with midweek and weekend samples varied by season or weather. A conversion factor of 3.5 (of passengers per car) is used when accurate figures are not available. Each refuge will develop a conversion factor for boats based on range of usage. Count a camper once for each 24-hour period or fraction thereof.

Item 1a: Acres - of refuge open for each type of hunting.

Managed hunts require check in and out of hunters, issuance of permits, or assignment of blinds.

Other - INCLUDE crow, fox, and similar hunting.

Lands adjacent to refuge. Normally considered within 1 mile or less of boundary, unless established sampling procedures cover a wider area. For big game hunting, the distance may be greater.

Item 1b: Acres of streams open to fishing, if practical; otherwise just miles open. Information on "shores" is primarily for coastal fishing.

Item 1c: Recreation. INCLUDE photography, observing wildlife, picnicking, swimming, boating, camping, visitor center use, tours, etc. TOTAL Recreation, Official, and Economic Use visits under Item 1.

Industrial. INCLUDE persons engaged in industry, i.e., oil industry or factories. EXCLUDE these from Item 1.

Item 2: INCLUDE the "On Refuge" groups in Items 1c and 1. In "Off Refuge" column include only those group meetings in which refuge employees actually participate. EXCLUDE these from Items 1c and 1.

Item 3: Exhibits - INCLUDE displays, fairs, parades, and exhibits OFF the refuge; EXCLUDE those ON.

INTERIOR--F ..., OREGON

3-1757
Form NR
(Rev. June 1960)

(1)

NONAGRICULTURAL COLLECT. .NS, RECEIPTS, AND PLANTINGS

Refuge National Bison Range Year 19 67

Species	Collections and Receipts (Seeds, rootstocks, trees, shrubs) Amount (Lbs., bus., etc.)	(2) C or R	Date	Method or Source	Cost	(3) Total Amount on Hand	Plantings (Marsh - Aquatic - Upland) Location of Area Planted	Rate of Seeding or Planting	Amount Planted (Acres or Yards of Shoreline)	Amount and Nature of Propagules	Date	Survival	Cause of Loss
R.M. Juniper	40	C	4/12	NER*	4.33	None	Jocko River Fishing Access Area		1/2 acre	7 cottonwood 7 dogwood	4/10	Poor	Drought
Cottonwood	40	C	4/13	"	4.33	None							
Quaking Aspen	20	C	4/13	"	2.16	None	Headquarters Area		1 acre	40 R.M.Juniper 40 cottonwood 20 Q.aspen	4/12	Poor	Drought
Dogwood	7	C	4/10	"	4.71	None							
Cottonwood	7	C	4/10	"	4.71	None	Exh.Pasture Irrig.ditch bank	10#/A.	1 acre	grass mix	4/14	Good	
Western wheat-grass seed	25#	R	4/14	Comm.	17.00	20#	Exh.Pasture erosion control	10#/A.	1/4 acre	grass mix	4/17	Good	
Kentucky bluegrass	25#	R	4/14	"	12.25	20#							
*Native stock							Entrance road-side erosion control	10#/A.	1/2 acre	grass mix	4/17	Good	

(1) Report agronomic farm crops on Form NR-8
(2) C = Collections and R = Receipts
(3) Use "S" to denote surplus

Total acreage planted:
Marsh and aquatic _____
Hedgerows, cover patches 3-1/4 acres
Food strips, food patches _____
Forest plantings _____

Remarks: _____

INTERIOR--PORTLAND, OREGON

3-1758
Form NR-6
(Rev. Jan. 1956)

Fish and Wildlife Service Branch of Wildlife Refuges C. Y. 1967

CULTIVATED CROPS - HAYING - GRAZING

Refuge National Bison Range County Lake State Montana

Cultivated Crops Grown	Permittee's Share Harvested		Government's Share or Return				Total Acreage Planted	Green Manure, Cover and Water-fowl Browsing Crops Type and Kind	Total Acreage
			Harvested		Unharvested				
	Acres	Bu./Tons	Acres	Bu./Tons	Acres	Bu./Tons			
None									
Note: 10-acre irrigated portion of west bison exhibition pasture plowed in Fall, 1967. Scheduled for reseeding to pasture grass mix in Spring of 1968.									
								Fallow Ag. Land	

No. of Permittees: Agricultural Operations None Haying Operations None Grazing Operations 2 - Refuge Personnel

Hay - Improved (Specify Kind)	Tons Harvested	Acres	Cash Revenue	GRAZING	Number Animals	AUM'S	Cash Revenue	ACREAGE
Mixed grass	36	40	None	1. Cattle				
				2. Other Horses	2	16	$32.00	148
				1. Total Refuge Acreage Under Cultivation				40*
Hay - Wild				2. Acreage Cultivated as Service Operation				40

* Periodic cultivation for grass hay production and irrigated pasture.

DIRECTIONS FOR PREPARING FORM NR-8
CULTIVATED CROPS - HAYING - GRAZING

Report Form NR-8 should be prepared on a calendar-year basis for all crops which were planted during the calendar year and for haying and grazing operations carried on during the same period.

Separate reports shall be furnished for Refuge lands in each county when a refuge is located in more than one county or State.

Cultivated Crops Grown - List all crops planted, grown and harvested on the refuge during the reporting period regardless of purpose. Crops in kind which have been planted by more than one permittee or this Service shall be combined for reporting purposes.

Permittee's Share - Only the number of acres utilized by the permittee for his own benefit should be shown under the Acres column, and only the number of bushels of farm crops harvested by the permittee for himself should be shown under the Bushels Harvested column. Report all crops harvested in bushels or fractions thereof except such crops as silage, watermelons, cotton, tobacco, and hay, which should be reported in tons or fractions thereof.

Government's Share or Return - Harvested - Show the acreage and number of bushels harvested for the Government of crops produced by permittees or refuge personnel. Unharvested - Show the exact acreage and the estimated number of bushels of grain available for wildlife. If grazing is made available to waterfowl through the planting of grain, cover, green manure, grazing or hay crops, estimate the tonnage of green food produced or utilized and report under Bushels Unharvested column.

Total Acreage Planted - Report all acreage planted, including crop failures.

Green Manure, Cover and Waterfowl Grazing Crops - Specify the acreage, kind and purpose of the crop. These crops and the acreage may be duplicated under cultivated crops if planted during the year, or a duplication may occur under hay if the crop results from a perennial planting.

Hay - Improved - List separately the kinds of improved hay grown. Annual plantings should also be reported under Cultivated Crops, and perennial hay should be listed in the same manner at time of planting.

Total Refuge Acreage Under Cultivation - Report total land area devoted to agricultural purposes during the year.

INT.-DUP. SEC., WASH., D.C.91767

3-1570
NR-88
(4/54)

REFUGE GRAIN REPORT

Refuge National Bison Range Months of January through December, 1967

(1) Variety*	(2) On Hand Beginning of Period	(3) Received During Period	(4) Total	(5) Grain Disposed of				(6) On Hand End of Period	(7) Proposed or Suitable Use*		
				Transferred	Seeded	Fed	Total		Seed	Feed	Surplus
Oats	560	0	560			244	244	316		316	
Barley	160	1,095	1,255			595	595	660		660	
Mixed grain (Oats & barley)	220	0	220			183	183	37		37	

(8) Indicate shipping or collection points 1,095 bushels barley hauled from Kalvalli Refuge during period 9/26 - 10/24/67.

(9) Grain is stored at barn and granary

(10) Remarks

*See instructions on back.

REFUGE GRAIN REPORT

This report should cover all grain on hand, received, or disposed of, during the period covered by this narrative report.

Report all grain in bushels. For the purpose of this report the following approximate weights of grain shall be considered equivalent to a bushel: Corn (shelled)—55 lb., corn (ear)—70 lb., wheat—60 lb., barley—50 lb., rye—55 lb., oats—30 lb., soy beans—60 lb., millet—50 lb., cowpeas—60 lb., and mixed—50 lb. In computing volume of granaries, multiply the cubic contents (cu. ft.) by 0.8 bushels.

(1) List each type of grain separately and specifically, as flint corn, yellow dent corn, square deal hybrid corn, garnet wheat, red May wheat, durum wheat, spring wheat, proso millet, combine milo, new era cowpeas, mikado soy beans, etc. Mere listing as corn, wheat, and soybeans will not suffice, as specific details are necessary in considering transfer of seed supplies to other refuges. Include only domestic grains; aquatic and other seeds will be listed on NR–9.

(3) Report all grain received during period from all sources, such as transfer, share cropping, or harvest from food patches.

(4) A total of columns 2 and 3.

(6) Column 4 less column 5.

(7) This is a proposed break-down by varieties of grain listed in column 6. Indicate if grain is suitable for seeding new crops.

(8) Nearest railroad station for shipping and receiving.

(9) Where stored on refuge: "Headquarters granary," etc.

(10) Indicate here the source of grain shipped in, destination of grain transferred, data on condition of grain, unusual uses proposed.

INT.-DUP. SEC., WASH., D.C. 17065

3-1979 (NR-12)
(9/63)

Bureau of Sport Fisheries and Wildlife

ANNUAL REPORT OF PESTICIDE APPLICATION

Refuge: National Bison Rang

Proposal Number: NBR-67-1, 2 & 6

Reporting Year: 1967

INSTRUCTIONS: Wildlife Refuges Manual, secs. 3252d, 3394b and 3395.

Date(s) of Application	List of Target Pest(s)	Location of Area Treated	Total Acres Treated	Chemical(s) Used	Total Amount of Chemical Applied	Application Rate	Carrier and Rate	Method of Application
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1) June 5 to July 3	Canada thistle (Cirsium arvense)	Hdqts.area, picnic area, roadsides & ditch banks	56	2,4-D Amine	28 gallons	2# a.e./acre	Water 56 acres @ 1/100	Bean Sprayer
(2) June 6 to July 17	Goatweed (Hypericum perforatum)	Head and South Fork, Pauline drainage	246	2,4-D Amine	123 gallons	2# a.e./acre	Water 69 A. @ 1/100; 177 A. @ 1/80.	Bean & Kromer Sprayers
(2) July 7	Goatweed	Alexander Basin above contour fence	360	2,4-D Amine	180 gallons	2# a.e./acre	Water 360 A. @ 1 to 3	Airplane
(6) June 20	Canada thistle	Hdqts. south entrance meadow	.04	Tordon 22K	6 ounces	2# a.e./acre	Water 1 oz./gal.	Hand Sprayer

10. Summary of results (continue on reverse side, if necessary)

(1) Canada thistle: Initial kill quite good, but results from past years indicate that actual kill with 2,4-D Amine is considerably less than results experienced in year sprayed would indicate.

(2) Goatweed: Excellent initial results with both methods of sparying.

(6) Canada thistle: This application involved experimental spot-spraying with Tordon 22K. Initial results appeared very good, with no fall re-sprouting noted.

See reverse for cost summary, and text for results of 1966 spraying.

INTERIOR--PORTLAND, OREGON

COST SUMMARY

(1) Canada Thistle

Materials	$ 52.36
Labor	271.16
Equipment	115.00
Total	$438.52
Cost /acre	$7.83

(2) Goatweed (Ground Application)

Materials	$230.01
Labor	462.72* (252.72)
Equipment	336.00
Total	$1,028.73* (818.73)
Cost/acre	$4.18* (3.33)

(2) Goatweed (Aerial Application)

Materials	$356.60
Labor	92.16
Equipment	450.00
Total	$898.76
Cost/acre	$2.50

(6) Canada Thistle

Materials	$ .00
Labor	7.54
Equipment	.46
Total	$8.00

* Includes 168 hours labor by N.Y.C. boys, not funded by refuge, @ $1.25 per hour, or $210.00 total.

12/13/67 - A two-year-old ram displaying "lip-curl", typical of rutting behavior. At the end of the year the bighorn sheep herd numbered 70 head, composed of; 13 adult rams, 8 yearling rams, 30 adult ewes, 6 yearling ewes, and 13 lambs. Augsburger

NATIONAL BISON RANGE (NWR)
NARRATIVE REPORT YEAR - 1967

NBR-67-5; 1/67 - Kickinghorse Job Corps crew removing rotted stringers and decking during Mission Creek bridge renovation project. Mazzoni

NBR-67-8; 1/67 - 21" steel girders replaced original log stringers. New lumber pressure-treated. Job Corps Center furnished material. Refuge contributed mobil-crane and technical assistance (Foreman May standing at left). Mazzoni

NBR-67-12; 2/67 - Proud crew poses with "their" new 20-ton capacity bridge, completed in eight days. Original concrete abutments used. May

NBR-67-13; 2/67 - River-run gravel was used to raise and improve bridge approaches. The storage area road system north of Mission Creek was also gravelled at this time. May

NBR-67-14; 2/67 - SAFETY Committee Chairman Hogge (in rope sling) demonstrates various rescue techniques at a monthly meeting. Mazzoni

NBR-67-19; 2/67 - Immobilized exhibition elk being treated by Ray Keyser, D.V.M., Ronan, (right) for severe lameness. Cause unknown, but disease-oriented problems are chronic with wild animals under confinement. Treatment was successful. Mazzoni

NBR-67-28; 4/67 - Kickinghorse Job Corpsmen on initial clearing work for development of fishing access and parking area on Jocko River Public Fishing Area. Mazzoni

NBR-67-37; 4/67 - Material supplied by Job Corps; refuge contributed technical assistance and some heavy equipment. This is only public access to Jocko between towns of Ravalli and Dixon. May

NBR-67-40; 4/67 - The annual accumulation of barnyard manure and waste hay was spread on bare spots subject to sheet erosion adjacent to the entrance and exhibition pasture roads. Middlemist with pitchfork. Mazzoni

NBR-67-41; 4/67 - The mixture serves as an excellent mulch, provides a degree of fertilization, and is a source of grass and weed seed for the revegetation process. Initial results were very good. Mazzoni

NBR-67-42; 4/67 - Native trees and shrubs, collected along the Jocko River, were transplanted to further stabilize a slope below the "H" canal just inside the headquarters entrance and improve the general esthetic qualities of the area. Mazzoni

NBR-67-66; 5/67 - Light cinnamon color of the newborn bison calf provides sharp contrast against the dark brown to almost black of adults. 105 eligible cows produced 89 calves for 85% calf crop. Production has averaged 89% for past fourteen years. May

NBR-67-68; 6/67 - Drainage and subsequent filling of this swampy area eliminated a serious SAFETY hazard to riders on horseback during annual bison roundup. Spring flow bisected main approach to corrals at this point. May

NBR-67-108; 7/67 - Goatweed control activities involved ground and aerial applications on 600 acres. This new 200-gallon spray unit was a valuable addition to our weed and fire control programs. May

NBR-67-103; 7/67 - Rehabilitation of 1.4 miles division fence between headquarters and slaughterhouse required replacement of all material. Old 7' big-game-type fence on left; new antelope-type (bottom wire 16" to 18" above ground) on right. From left: Middlemist & Krantz. Mazzoni

NBR-67-107; 7/67 - Two girls and three boys employed during the summer under the N.Y.C. program turned out to be a hard working, industrious bunch of kids, and made a fine contribution to the program. Above, staining juniper vehicle barriers. Mazzoni

NER-67-70; 7/67 - Self-service, honor system designed to handle entrance fee program initiated this year avoided need for attendant, but resulted in occasional traffic jams, public misunderstanding and sales discrepancies. May

NER-67-105; 7/67 - Self-service information booth (containing refuge leaflets and current items of interest) provided basic public information service before and after office hours, and appealed to a surprising number of casual-interest visitors. Mazzoni

NBR-67-104; 7/67 - An estimated 23,400 people travelled the 19-mile self-guiding tour route during the June 1 - Sept. 30 tour season, despite dusty roads and inactive wildlife resulting from prolonged hot, dry summer weather. Mazzoni

NBR-67-138; 8/67 - People are attracted by the tour's scenic beauty, wild flowers, and the sheer variety of birds and animals. But nearly all come primarily to see a herd of bison in a semblance of the species' natural environment. Mazzoni

NBR-67-127; 8/67 - Renovation of nearly two miles of 7' big-game-type fence, comprising the various bison holding pastures at the corrals, was completed during the year. New fence center, left. Old fence on right. Mazzoni

NBR-67-94; 8/67 - "Family" portrait. From upper left, clockwise: yearling bull, adult bull, adult cow, adult cow, calf, adult cow. Although lameness reminiscent of the 1965 disease problem was noted in two or three calves, no natural losses occurred in 1967. Mazzoni

NBR-67-121; 8/67 - Maintenanceman Kraft puts the finishing touches on a fresh coat of paint for the oldest building on the refuge. Constructed in 1909, the year following refuge establishment, the "Cow Barn" still provides needed storage space. Mazzoni

NBR-67-129; 8/67 - The extensive bison corral renovation and replacement work, completed just prior to roundup in 1966, was followed up this year with a preservative-stain application on all new wood. Mazzoni

NBR-67-125; 8/67 - Several sections of Mission Creek were straightened years ago to facilitate construction of roads and exhibition pastures in the headquarters area. One result was accelerated stream flow and bank erosion. Mazzoni

NBR-67-126; 8/67 - First step in stream rehabilitation was construction of rock checks, or low drop-dams, to impede stream flow and retard bank erosion. The first checks were completed this year. Additional checks, rock jetties and spot rip-rapping will be used during the course of this continuing project. Mazzoni

NBR-67-131; 9/67 - White-tailed deer fawn found dead in picnic area. Undoubtedly the work of a bobcat, but actual cause of death may have involved fence shown in upper right. Mazzoni

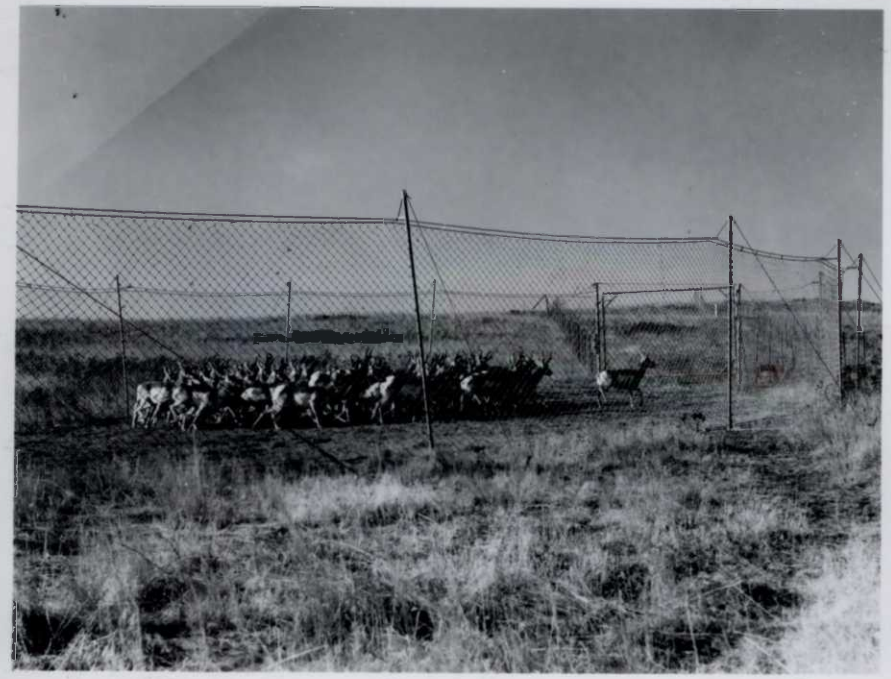
NBR-67-142; 9/67 - This massive infection was originally diagnosed as the result of a broken penis. When the five-year-old bull bison was collected, infection was found to be related to severe horn wound anterior to penis. Worsening condition would no doubt have led to death. Mazzoni

NBR-67-145; 9/67 - Location of north holding pasture and horse corral was modified to permit development of public parking area and truck turn-around at slaughterhouse. Contract painting of these buildings had been completed at this time. Mazzoni

NBR-67-152; 10/67 - The annual buffalo roundup retains its unique appeal to writers and photographers. From left: Outdoor author-photographers Joe Van Wormer and Ed Parks, Bend, Oregon, and Dan Snyder, President, KRTV, Great Falls. Mazzoni

NBR-67-151; 10/67 - A total of 407 animals were tallied at roundup. At the end of the year, the herd numbered 327. From left: Kraft, Hogge, Middlemist, Priddy and Krantz. Mazzoni

NBR-67-153; 10/67 - Approximately 400 people came to view corral activities during roundup. Animals in foreground behind fence were part of 55 head sold alive. Live sales totaled $22,704.54 or $412.81 per animal. Mazzoni



NBR-67-175; 11/67 - Poor flying weather and interior fences hampered surplus antelope live-trapping project, but 54 animals were successfully trapped. Montana Fish and Game provided trap and very capable assistance of trapping foreman Jim McLucas. Mazzoni

NBR-67-178; 11/67 - 51 were finally loaded out for Utah Fish and Game for use in reproductive study. Each animal was injected with combination anti-stress hormone and antibiotic prior to loading. From left: Kraft, D.V.M. Keyser, Middlemist and Taylor. Mazzoni

March, 1967 - Waterfowl made extensive use of the display pond during the year. The resident refuge Canada goose flock of 25 to 30 birds produced two broods in the headquarters area, to the delight of visitors. About 800 ducks and 25 geese were using the refuge at the end of the year. Mazzoni

November, 1967 - The white-tailed deer has been our most difficult big-game species on which to obtain accurate population data. The refuge population was estimated at 200 head at the close of the year. Augsburger